AMENDED
RECORD OF DECISION

MEDLEY FARM DRUM DUMP
SUPERFUND SITE

EPA ID: SCD 980 558 142

Gaffney, Cherokee County, SC

Prepared by:
U. S. Environmental Protection Agency Region 4
Atlanta, Georgia

August 2012

DECLARATION FOR THE AMENDED RECORD OF DECISION

Site Name and Location

This Amended Record of Decision is for the Medley Farm Drum Dump Site, located at 887 Burnt Gin Road approximately five miles south-southwest of Gaffney, Cherokee County, South Carolina. The United States Environmental Protection Agency (EPA) Site Identification Number for the Medley Farm Drum Dump Site is SCD980558142. The 1991 Record of Decision (ROD) addressed the entire site as one Operable Unit (OU).

Statement of Basis and Purpose

EPA is amending the groundwater component of the selected remedy for the Medley Farm Drum Dump Superfund Site (the Site). The original Site remedy was chosen in a May 29, 1991 Record of Decision (ROD) issued in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300, as amended. This Amendment to the 1991 ROD has been prepared in accordance with Section 117 of CERCLA, as cited above, and with 40 CFR § 300.435(c)(2)(ii) of the NCP.

EPA is the lead agency for this Site and the South Carolina Department of Health and Environmental Control (SCDHEC) is the support agency. SCDHEC concurs with the amended selected remedy.

The Amended Site Remedy described in this document will change the remedial technology being used to clean up groundwater. The soil component of the 1991 ROD Site Remedy is not changed by this Amendment to the ROD. The Site Remedial Action Objectives (RAOs) and cleanup goals specified in the 1991 ROD are not modified by this Amendment to the ROD. The requirement for continued analytical monitoring for contaminants in groundwater and surface water is not changed and will remain in place.

The 1991 ROD required the use of a groundwater pump and treat system to capture and treat Site groundwater contaminated with volatile organic compounds (VOCs) above ROD-established established remedial goals. Air stripping was to be employed to remove VOCs from the groundwater. Treated groundwater was to be discharged to Jones Creek via a National Pollution Discharge Elimination System Permit. The remedy also included continued analytical monitoring for contaminants in groundwater and surface water.

This document amends the groundwater component of the remedy to employ Enhanced Reductive Dechlorination (ERD) as an active treatment process to address groundwater contamination. Treatment involves injecting a lactate-nutrient solution into the affected groundwater, through one or more wells. After injection, a rest period follows during which groundwater flow distributes the solutions in the groundwater, followed by groundwater monitoring, including sampling, to determine the effectiveness of the treatment. An estimated five-year period of annual injection treatments (5 treatments) will be implemented, followed by a five-year groundwater monitoring period to achieve groundwater cleanup levels and remedial action objectives. The remedy will be implemented until the cleanup levels are achieved.

This Amendment also selects monitored natural attenuation (MNA) as a contingency remedy. The contingency remedy will be invoked in the event that ERD cannot meet the cleanup levels sooner than MNA would meet them, and that ongoing natural attenuation processes will bring Site groundwater contaminant levels below the cleanup goals in a time frame that is reasonable compared to other alternatives. MNA will be implemented in accordance with EPA's MNA Guidance, which requires that Site groundwater data must demonstrate that natural attenuation is occurring at a rate that will lead to meeting cleanup levels in a reasonable time frame. If EPA determines that it is appropriate to transition the selected remedy (ERD) for the Site or any portion of the Site to the Contingency Remedy, MNA, EPA will approve the transition by issuing an Explanation of Significant Differences (ESD).

This decision is based on the Administrative Record for the Medley Farm Drum Dump site, which has been developed in accordance with Section 113(k) of CERCLA, 42 USC Section 9613(k). This amendment to the 1991 ROD will become part of the Administrative Record for the Site. The Administrative Record is available for review at the Cherokee County Gaffney Branch Library in Gaffney, South Carolina, and at the United States Environmental Protection Agency (EPA) Region 4 Records Center in Atlanta, Georgia, at the following locations:

Cherokee County Library, Gaffney Branch
300 East Rutledge Avenue,
Gaffney, SC 29340
(864) 487-2711
Branch Hours: Mon-Thurs 9-7, Fri 9-5, Sat 9-4

U.S. EPA Region 4, Record Center
61 Forsyth St. SW, 11th Floor
Atlanta, GA 30303
(404) 562-8946
Mon-Fri 7:30-4:30

Assessment of Site

The response action selected in this Amended ROD (AROD) is necessary to protect the public health or welfare and the environment from actual or threatened releases of hazardous substances, pollutants and contaminants from this Site, which may present an imminent and substantial endangerment.

Description of the Amended Groundwater Remedy and Contingency Remedy

The amended groundwater remedy for the Medley Farm Drum Dump site is Enhanced Reductive Dechlorination (ERD), which is estimated to cost $1.51 million. Components of the amended Selected Remedy are described in Section 6.2. The major components are:

- Expand the existing groundwater injection system infrastructure
- Implement, over five years, annual ERD injection treatments and the associated groundwater monitoring events;
- Continue periodic monitoring of Site groundwater and surface water for an anticipated period of five years to reach the Site cleanup goals;
- Maintain existing institutional controls (land use restrictions);

- Support EPA's conduct of Five-Year Reviews, to ensure protectiveness of the remedy; and,
- Continue site maintenance activities.

The contingent groundwater remedy selected in this document is MNA, which is estimated to cost $570,500. Components of the contingency remedy are described in Section 6.3. The major components are:

- Implement a detailed and systematic program of periodic groundwater and surface water monitoring, following EPA's MNA Guidance, for an anticipated period of 30 years or until the Site groundwater cleanup goals are met;
- Maintain existing institutional controls (land use restrictions);
- Support EPA's conduct of Five-Year Reviews, to ensure protectiveness of the groundwater remedy; and,
- Continue Site maintenance activities.

Statutory Determinations

The Amended Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. For groundwater, which is the focus of the ROD Amendment, this remedy satisfies the statutory preference for treatment as a principal element of the remedy.

The National Oil and Hazardous Substances Contingency Plan (NCP) establishes an expectation that EPA will use treatment to address the principal threats posed by a Site wherever practicable (40 CFR § 300.430(a)(I)(iii)(A). Principal threat wastes, consisting of hazardous wastes and contaminated soils, were removed from the site as part of the 1983 Removal Action, and subsurface soils have been remediated under the remedy selected in the 1991 ROD. As a result, there are no principal threat wastes addressed by this amendment.

Because the remedy for the Site results in hazardous substances, pollutants, or contaminants remaining on-site in the form of contaminated groundwater, which are present at concentrations above levels that allow for unlimited use and unrestricted exposure, reviews must be completed at least every five years. EPA approved the third Five-Year Review (FYR) for this Site on September 1, 2009. The next FYR is required to be completed by September 1, 2014. FYRs will continue until the Site is determined to be acceptable for unlimited use and unrestricted exposure.

Data Certification Checklist

The following information is included in the Decision Summary for this Amendment to the ROD. Additional information can be found in the Administrative Record file for this Site.

- Chemicals of concern (COCs) and their respective concentrations
- Baseline risk represented by the chemicals of concern

- Cleanup levels established for chemicals of concern and the basis for these levels
- How source materials constituting principal threats have been addressed at the Site
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD
- Potential land and groundwater use that will be available at the site as a result of the Selected Remedy
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected
- Key factor(s) that led to selecting the remedy (i.e., describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision)

Authorizing Signatures

This ROD Amendment documents the amended selected remedy for contaminated groundwater at the Medley Farm Drum Dump Site. EPA selected this amended remedy with the concurrence of the SCDHEC. (Appendix A includes the concurrence letter). The EPA Region 4 Director of the Superfund Division has been delegated the authority to approve and sign this ROD Amendment.

Franklin E. Hill, Director
Superfund Division
EPA, Region 4

8/15/12
Date

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ABBREVIATIONS AND ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
AROD	Amended Record of Decision
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (1980), as amended
COC	Contaminant of Concern
DP	Dual Phase
EPA	United States Environmental Protection Agency
ERD	Enhanced Reductive Dechlorination
ESD	Explanation of Significant Differences
FYR	Five-Year Review
IC	Institutional Control
ISCO	In-situ Chemical Oxidation
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
MW	Monitoring Well
NCP	National Contingency Plan
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
O&M	Operations and Maintenance
OU	Operable Unit
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RG	Remedial Goal
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act (1986)
SCDHEC	South Carolina Department of Health and Environmental Control
SDWA	Safe Drinking Water Act
SVE	Soil Vapor Extraction
UIC	Underground Injection Control
USC	United States Code
USDW	Underground Source of Drinking Water
VOC	Volatile Organic Compound
WWTU	Wastewater Treatment Unit

DECISION SUMMARY

1.0 Introduction to the Site and Statement of Purpose

1.1 Site Description

The Medley Farm Drum Dump Superfund Site is located on an approximately 62-acre tract of rural land lying just east of Burnt Gin Road (County Hwy 72), about five miles south of Gaffney, South Carolina (see Figure 1). The Site is located in an area of rolling hills with elevations ranging from 570 to 680 feet above mean sea level. Land use in the vicinity is primarily agricultural and residential. The United States Environmental Protection Agency (EPA) Site Identification Number for the Medley Farm Drum Dump Site is SCD 980 558 142. The 1991 Record of Decision (ROD) addressed the entire site as one Operable Unit (OU).

Since the completion of a 1983 EPA Removal Action, the area used in the past for waste disposal has been maintained as a grass-covered open field. The former disposal area and the resultant groundwater contamination plume together occupy an area of about 10 acres. The 62-acre parcel is vacant with the exception of one residence, which is located 300 feet east of Burnt Gin Road on a small easement at the northwest corner of the property.

1.2 Statement of Purpose

EPA is amending the groundwater component of the selected remedy for the Medley Farm Drum Dump Superfund site (the Site).

The original remedy was selected in a May 29, 1991 Record of Decision (ROD) issued in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), 42 USC §§ 9601 *et seq*., and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300, as amended. This Amendment to the 1991 ROD has been prepared in accordance with Section 117 of CERCLA, and with 40 CFR § 300.435(c)(2)(ii) of the NCP.

EPA is the lead agency for this Site and the South Carolina Department of Health and Environmental Control (SCDHEC) is the support agency. SCDHEC concurs with the amended selected remedy.

The amended groundwater remedy selected in this document changes the remedial technology being used to clean up groundwater. The soil component of the 1991 ROD Site Remedy is not changed by this Amendment to the ROD. The Site Remedial Action Objectives (RAOs) and cleanup levels specified in the 1991 ROD are not modified by this Amendment. The requirement for continued analytical monitoring of contaminants in groundwater and surface water is not changed and remains in place.

The 1991 ROD selected groundwater pump and treat to capture and treat groundwater contaminated with volatile organic compounds (VOCs) above levels that posed an unacceptable risk. Air stripping was the technology to remove VOCs from the water. Off-gas emissions from the air stripping process were evaluated in the remedial design and found to not require treatment prior to release to the atmosphere. As a result, an Explanation of Significant Differences was issued in 1993 to document the decision not to require treatment of air stripper emissions. Treated groundwater would be discharged to Jones Creek via a National Pollution Discharge Elimination System Permit. The remedy also included continued analytical monitoring of contaminants in groundwater and surface water.

This Amendment modifies the groundwater remedy to employ Enhanced Reductive Dechlorination (ERD), as the active treatment process for the contaminated groundwater. Treatment involves the injection of a lactate-nutrient solution into the affected groundwater, through one or more wells. The lactate solution has two effects: 1) it provides a food source that fosters the growth and activity of microbial populations that consume (breakdown) the groundwater contaminants, and 2) it causes chemical conditions to become more favorable for such growth and activity. After injection of the lactate nutrient solution, a rest period follows during which groundwater flow distributes the lactate solution in the groundwater, followed by a groundwater sampling event to determine the degree and vertical/horizontal extent of the treatment. The Focused Feasibility Study prepared in support of this Amendment estimated that a five-year period of annual injection treatments (5 treatments) would be required, followed by a five-year groundwater monitoring period to reach the Site cleanup levels.

The Amended Site Remedy also includes a contingency for Monitored Natural Attenuation (MNA). It is EPA's intention and expectation that the Selected Remedy, ERD, will achieve the cleanup levels, and additionally promote conditions conducive for natural attenuation. However, if after implementation of the ERD injections the contaminant levels do not decline to below cleanup levels after the expected period of time, EPA will evaluate site conditions and determine if conditions are favorable for, and meet the proper conditions for, a transition to MNA. Throughout the ERD implementation period, sampling will be conducted to obtain the lines of evidence for MNA as recommended and required by EPA's MNA guidance. EPA will officially approve the transition of the remedy for applicable portions of the Site, or the entire Site, from ERD to MNA by issuing an Explanation of Significant Differences (ESD). Groundwater Remedial Action Objectives (RAOs) and cleanup levels remain unchanged from the 1991 ROD.

1.3 Administrative Record

The decision outlined in this document is based on the Administrative Record for the Medley Farm Drum Dump Site, which has been developed in accordance with Section 113(k) of CERCLA, 42 USC § 9613(k), and 40 CFR § 300.800(a) of the NCP. This amendment to the 1991 ROD will become part of the Administrative Record for the Site, as required under 40 CFR § 300.825(a)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The Administrative Record is available for review at the Cherokee County Gaffney Branch Library in Gaffney, South Carolina, and at the EPA Region 4 Records Center in Atlanta, Georgia, at the following two locations:

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2.0 Site History, Contamination, and Original Selected Remedy

2.1 Site Background

From approximately 1973 to 1976, several area textile, paint, and chemical manufacturing firms paid to dispose of their industrial wastes on the Medley property. The Site was first documented in 1981 when a firm disposing of wastes at the Site complied with the disposal notification requirements of CERCLA, reporting its use of the Medley Farm Site to EPA.

In May 1983, in response to a local citizen who witnessed the disposal of barrels on the Medley property, SCDHEC took samples at the Site. SCDHEC notified EPA of the presence of approximately 2,000 half-buried drums, many of which were leaking. EPA also investigated and sampled wastes, soil, and water at the Site. EPA then performed an emergency Removal Action during June and July 1983. This action included removing more than 5,300 fifty-five-gallon drums and fifteen-gallon containers of waste, 2,100 cubic yards of refuse and contaminated soil, and 70,000 gallons of water and sludge from six small waste lagoons on the Site. The lagoon areas were then backfilled and graded. Testing of the solid and liquid waste materials removed from the property indicated that the primary chemicals of concern were volatile organic compounds (VOCs). Site conditions just before the Removal Action (June 1983) are shown in Figure 2.

SCDHEC and EPA conducted several investigative studies on the Medley property from 1983 to 1984. These studies included the sampling of private wells in the Site vicinity, a geological study, more extensive groundwater sampling, and a preliminary investigation of Site hydrogeology. During this same period, EPA compliance staff also initiated investigations to identify individuals and firms responsible for the waste disposal activities. Over the following two and one-half years, EPA negotiated with several of the potentially responsible parties (PRPs) to investigate contamination at the Site. The Medley Farm Drum Dump Site was proposed for addition to the National Priorities List (NPL) in June 1986. The Site was placed on the NPL in March 1989.

In January 1988, six PRPs signed an Administrative Order on Consent with EPA, under which they agreed to conduct a Remedial Investigation/Feasibility Study (RI/FS) for the Medley Farm Site. The RI/FS began in late 1988 and was completed in early 1991. The RI/FS findings determined that the soil was contaminated with VOCs in three primary areas. It was also determined that the groundwater was contaminated with VOCs.

2.2 1991 Record of Decision Selected Remedy

The RI/FS demonstrated that hazardous substances were present in soil and groundwater at the Site. As a result of the RI/FS results and Baseline Risk Assessment, EPA determined that remediation of surface soil and groundwater would be required for the protection of human health and the environment. In the Baseline Risk Assessment, excess human health risks were found to be present in an assumed future-use scenario in which groundwater was used as a drinking water source. Risk was not found to exist under the then-current land use scenario, which included Site resident and trespasser contact with soils, but no usage of groundwater. Site soils were found to pose no unacceptable risks under either current-use or future-use scenarios. However, contaminated subsurface soil was shown to have the potential to act as a continuing source of COCs, via leaching, to groundwater. No ecological risk was identified at the Site.

The Proposed Plan issued by EPA in February 1991 set forth the Remedial Action Objectives (RAOs) for the Site. These were developed based on the information developed in the RI/ FS, and Baseline Risk Assessment. In support of the RAOs, applicable or relevant and appropriate requirements (ARARs) and specific quantitative cleanup goals were established in the 1991 ROD. The cleanup goals were referred to as remedial goals (RGs) in the ROD, and will be termed "cleanup goals" or "cleanup levels" in this Amendment.

Table 1 lists the specific cleanup levels assigned to the Site COCs in soil and groundwater listed above. Cleanup goals for groundwater COCs were based upon drinking water standards for potable water aquifers under the Safe Drinking Water Act, and on risk-based determinations from the risk assessment. For Site soil, the cleanup levels were based on preventing leaching of contaminants to groundwater from the soils.

On May 29, 1991, EPA issued a ROD that selected the following remedy:

Groundwater: Construction and operation of a groundwater pump-and-treat system:
- Extraction of contaminated groundwater;
- On-site treatment of extracted groundwater via air stripping, with the need for controlling air stripper emissions to be evaluated in the remedial design;
- Off-site discharge of treated groundwater to Jones Creek via a National Pollution Discharge Elimination System (NPDES) permit; and
- Continued analytical monitoring of groundwater and surface water.

Soil: Construction and operation of a Soil Vapor Extraction (SVE) system:
- Installation of a network of air extraction wells in the unsaturated zone;
- Construction of a pump and manifold system that applies a vacuum on the air extraction wells to remove the contaminants from the soil; and
- Use of an in-line vapor-phase carbon absorption system to trap and absorb the soil vapor, prior to its release to the atmosphere.

2.2.1 1993 Explanation of Significant Differences

The remedy was modified in December 1993 by an Explanation of Significant Differences (ESD) issued by EPA Region 4. The ESD removed the requirement to treat groundwater and SVE system air emissions prior to discharge. This decision was based on air dispersion modeling. Modeling also indicated that anticipated emission levels for both systems were well below those which could require treatment under a permit. Results from monitoring of both systems during startup operations in 1995 validated the modeling and the decision to issue the ESD.

2.2.2 2010 Explanation of Significant Differences

A second modification to the remedy was completed in September 2010. The ESD added the requirement that institutional controls (ICs) be implemented on the property as part of the groundwater remedy. The required ICs were implemented by the PRPs in May 2009 in the form of a restrictive covenant. The covenant restricts designated land uses by prohibiting any residential use and educational use for children/young adults in kindergarten through twelfth grade; prohibiting the use of groundwater for any purpose until drinking water standards are met; and prohibiting any activity at the Site that may impede implementation of the remedy. The restrictive covenant is recorded at the Cherokee County Courthouse in Gaffney, SC.
No institutional controls were present in the original Site remedy.

2.3 Elements of the Remedy Performed to Date

During the latter half of 1991 EPA and eight PRPs negotiated a Consent Decree (CD) for design and implementation of the Site remedy (RD/RA). The CD was entered by the U.S. District Court for the District of South Carolina, Greenville District on March 27, 1992, Civil Action Number 6:92-0153-20.

2.3.1 Remedial Design

In September 1993, EPA approved the Remedial Design (RD) for cleanup of the Medley Farm Drum Dump Site. The groundwater pump-and-treat system, and for soil the SVE system, operated from January of 1995 through late 2004.

Prior to the design of the soil and groundwater treatment systems, an extensive Site geology investigation was conducted as part of a larger data-gathering task. This work was a 1991 ROD requirement intended to determine why Site groundwater moves preferentially northeastward, rather than downhill towards and into Jones Creek, as might be expected based on the Site's water table. Work included geologic field mapping, geologic study of trenches across the apparent fault line, and reviewing top-of-bedrock contour maps created both during the RI/FS, and newer maps generated from continuous rock-core drilling at Site boreholes. The result was the recognition of the presence of a reverse fault (along the blue line in Figure 3) located southeast and downgradient of the former disposal area. The fault is a major reason for the elongation of the impacted groundwater plume to the northeast. The fault, and related joints and fractures aligned parallel to it, serve to block southeastward flow of groundwater into Jones Creek, instead fostering a northeastward flow direction. The fault strikes N50E and dips 70 degrees to the southeast. Recognition of the fault prevented improperly locating the groundwater extraction wells, which could easily have occurred if this important feature had not been investigated.

The groundwater pump-and-treat system design included 11 extraction (pumping) wells and associated pipelines to direct the extracted groundwater to a central air-stripping unit. Pumping wells are arranged into two "arms," with 7 wells placed along an "A-line" (System A wells) and 4 along a "B-line" (System B wells). The pumping system was a pressurized, "jet pump" system which draws water into the pumping wells via suction-based *venturi* intakes; no electric pumps are used and there are no moving parts inside the system lines or wells. A low-profile air-stripping unit removed the VOCs from groundwater. After treatment, treated water was discharged to Jones Creek under NPDES Permit No. S00046469. The permit has been maintained since 1994 and remains in force. The SVE system design included an array of nine vapor extraction wells piped to a central vacuum apparatus, to remove VOCs from three main areas of soil contamination designated for treatment in the 1991 ROD (referred to as Areas 1, 2 and 3). An additional eight vapor monitoring wells were installed surrounding the three areas to monitor system effectiveness. Figure 3 shows the layout of the SVE and groundwater pump-and-treat systems, and the groundwater contamination extent (1993 Remedial Design).

2.3.2 Remedial Action

On-site construction of the SVE and groundwater remediation systems began in June 1994. The majority of the construction work was completed by early December 1994. Both systems became fully operational in March 1995.

In 1998, as an optimization measure and to enhance the recovery of soil vapors from the subsurface, the SVE system was augmented by the connection of the eight soil vapor monitoring wells to the vacuum extraction system. Borings conducted completed in 1999 showed the soil cleanup targets in Areas 1 and 2 had been achieved. As a result, SVE operations were terminated in these areas with EPA approval in June 2000. Groundwater samples from the Area 3 boreholes, however, showed contamination at levels exceeding that found in any of the groundwater recovery wells.

To address this contamination, three dual phase (DP) recovery wells were installed in October 2000 in Area 3, to enhance the capture of both soil vapor and groundwater for treatment. The installation of these wells was part of a "technical maximization measures" program. Other measures implemented included alternate pumping-well schemes, and pulse purging the system. In 2001 a 120-foot bedrock monitoring well (designated MW-3D) was installed to better characterize the VOC concentration remaining in the groundwater in this area.

Continued operations of the SVE and groundwater pump-and-treat systems during 2001-2004 resulted in capturing a substantial yield of VOC contaminant mass removed from the aquifer and Site soils. As of September 2004, the groundwater recovery and treatment system had captured and treated more than 100 million gallons of groundwater and removed approximately 250 pounds of VOCs. More than 2,250 pounds of VOCs had been removed by the SVE system.

In 2004, EPA approved cessation of SVE operations in accordance with the Site's approved Performance Standards Verification Plan (PSVP). No changes are contemplated for the 1991 ROD soil remedy component; therefore, soil cleanup is not addressed further in this Amended Record of Decision.

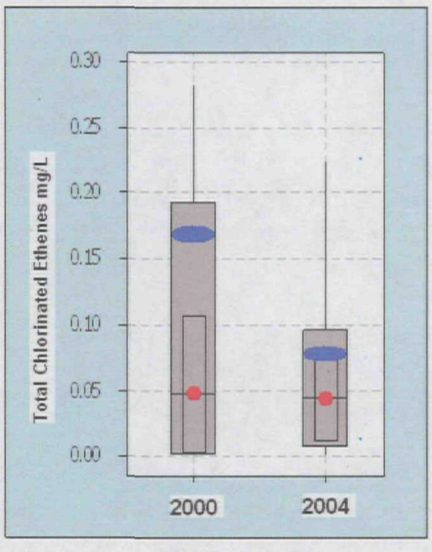
In June 2004, the PRPs' contractor prepared a report (see References) summarizing Site cleanup progress to date, and proposing an additional groundwater contingency measure (an optimization measure) intended to accelerate and complete the cleanup of groundwater. Groundwater contingency measures are generally described in section 11 (The Selected Remedy) of the 1991 ROD.

The 2004 report described and documented a substantial decline in performance from the groundwater pump-and-treat system. Measured as pounds (lbs) of VOC mass removed per unit of million gallons of treated groundwater (Mgals), the rate of VOC removal had declined by some 84% between 1995 and 2003. The recorded annual VOC mass totals were:

1995: 5.1 lbs of VOCs/Mgals of water
2000: 1.5 lbs of VOCs/Mgals of water
2001: 1.8 lbs of VOCs/Mgals of water
2002: 1.5 lbs of VOCs/Mgals of water
2003: 0.8 lbs of VOCs/Mgals of water

Figure 4 (taken from the 2004 report) illustrates the decline in VOC mass removal performance using two sets of bar graphs. The upper bar graph shows the COC mass removed yearly, in pounds, and the corresponding volume of groundwater treated. The lower graph presents the same information broken out by individual wells and system (A, B).

A simple numerical comparison of Site groundwater COC levels from November of 2000, just before the DP recovery wells were added to the pumping system, to data from September 2004 also shows this decline. The comparison can be made using the *total chlorinated ethenes* concentration at all Site wells, a sum which includes the levels of TCE, PCE, and the breakdown products of those two COCs. These COCs (total chlorinated ethenes) account for virtually all Site COC contaminant mass. In 2000, the mean (arithmetic average) level of total chlorinated ethenes of all Site wells was 0.1682 milligrams per liter (mg/l). The 2004 level was 0.0784 mg/l. This represents a decline of some 53%.



The degree of COC reductions achieved can be visualized by comparing graphic "boxplots" for the data sets for the two data sets described above. In the graphic at left, the top and bottom of each gray box represents the minimum and maximum of the group of data points (COC levels at individual wells) lying between 25% and 75% of the maximum found; the maximum level recorded is the top of the centered vertical line. The blue oval, above the 2009 box and in the upper part of the 2004 box, represents the mean, or average, COC level in all Site wells. The red circle with a horizontal line extending across the box middle is the "median," a concentration at which COC levels in half of the Site wells are below, and half above. The boxplots illustrate that groundwater COC levels have been significantly reduced, as can be seen particularly for the mean (blue oval).

In responding to the report, EPA and SCDHEC agreed with the conclusion presented there that the system had reached steady-state conditions, with little potential for improvement, and therefore approved cessation of groundwater pump-and-treat operations.

The report considered three possible groundwater contingency measures that could use the existing Site pump-and-treat system infrastructure (wells and water/air lines) in order to "polish" down the remaining areas of groundwater which still contained COCs above the cleanup levels. The measure proposed was enhanced biological degradation of the COCs using reductive dechlorination. This groundwater contingency measure has been referred to in Site documents as the "Supplemental RA." EPA and SCDHEC approved the PRPs' work plans for the Supplemental RA in August 2004.

The treatment methodology was referred to as "enhanced bioremediation" in the 2004 report, but the same basic methodology is also known as "enhanced biodegradation," "enhanced anaerobic bioremediation," "enhanced reductive dechlorination," and by other terms. Project personnel for the PRPs' contractor use the term "enhanced reductive dechlorination (ERD)" and this term is used in this and other Site documents. The process being enhanced is reductive dechlorination, which is a one-way, non-reversible process that destroys the COCs by chemically changing them into other less-toxic compounds, and eventually into non-toxic compounds. The treatment effect occurs *in-situ* (in-place), within the aquifer and below the ground surface.

ERD is implemented by performing groundwater injection events, then allowing a "rest period" during which groundwater flow distributes the solutions in the groundwater, followed by a groundwater sampling event to determine the degree, and horizontal and vertical extent, of the treatment effect.

The treatment begins with conducting an injection event. Nutrient (lactate) solutions are mixed on site and placed into select groundwater wells. Based on well contaminant concentrations, formation hydraulic conductivity, experience with flow-rates that can be accepted at each well, and other factors, the solutions are mixed using clean (sample-verified) on-site well water to which the nutrient is added, and pumped into the wells being treated. The lactate solution has two effects: 1) it provides a food source that fosters the growth and activity of microbial populations that consume (breakdown) the COCs, and 2) it causes chemical conditions to become more favorable for such growth and activity.

The use of site groundwater to mix the solutions, made necessary by the Site's remote location, required that an Underground Injection Control (UIC) Permit be secured and complied with in conducting injection events as part of the Supplemental RA. The permit (State of SC UIC Permit No. 763) has been maintained since 2005 to govern all Site injection activities.

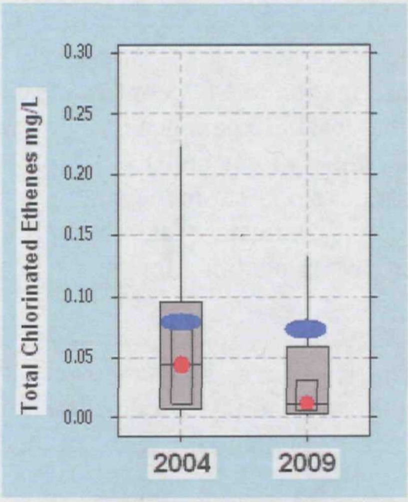
After each injection, a variable period of time is allowed for groundwater equilibrium to be restored, during which groundwater flow distributes the solutions in the groundwater. A groundwater sampling event is then performed to determine the effects, and the areal influence, of the treatment.

Between October 2004 and March 2010, six groundwater nutrient injections were administered, each followed by a monitoring period before sampling. Reports on the progress of the treatments, and EPA reviews of the reports, indicate that in general contaminant levels in groundwater have been reduced significantly in wells across the site. The results have not been uniform in all wells, and some portions of the Site still have groundwater above the cleanup levels. However, the overall results have been very good and reflect significant progress.

3.0 Basis for Amended Record of Decision

3.1 Progress of Supplemental RA

As part of the 2009 Third Five-Year Review (FYR) for the Site (see References), EPA performed a quantitative review of Site groundwater cleanup remedial progress since 2004. The review concludes that, since 2004, continued reductions in the groundwater COC concentrations and remaining contaminant mass have been achieved, and that the strategy employed in the Supplemental RA has in general been successful.



The degree of COC reductions achieved can be visualized by comparing graphic boxplots similar to those presented above. The boxplot at left shows that groundwater COC levels have been significantly reduced during the Supplemental RA, as can be seen particularly for the median (red circle). The mean (blue oval) has not been reduced as far, because while many wells no longer have any COCs above the goals, the few that remain above are those with higher levels.

The groundwater data review also drew important qualitative conclusions about ERD, as used in the Supplemental RA. One conclusion was that the enhanced reductive dechlorination processes used in the treatments appear active and robust; among other indications this can be seen in the widespread production of dechlorination daughter compounds. Overall, the assessment concludes that continued ERD would be a reasonable strategy for achieving continued progress toward the cleanup levels and remedial action objectives.

Although the Supplemental RA has fulfilled the purpose of groundwater contingency measures as described in the 1991 ROD, the length of time it has been underway has exceeded EPA's plans and expectations. Partly this is due to the reductions achieved in Site COC groundwater levels which led to periodic expectations, at times during 2006-2009, that the next injection treatment might bring all Site COCs to below the cleanup levels. On balance, the results since 2004 indicate that while the Supplemental RA has achieved progress, additional action will be necessary to complete the cleanup. Recognizing this, the 2009 FYR included a recommendation that potential cleanup alternatives be evaluated, and the remedy modified to continue to make progress and eventually achieve the groundwater cleanup levels and RAOs. To support the remedy modification, a Focused Feasibility Study (FFS) was initiated in early 2010.

3.2 Extent of Remaining Groundwater Contamination

As a result of the activities described above, the extent of the remaining groundwater contamination has been significantly reduced. Figure 5 from the FFS illustrates the extent of the remaining groundwater contamination. (Only the distribution of trichloroethene (TCE), one of the two main remaining COCs, is shown because the other COCs are all present within the TCE area.) The lighter-colored, larger oval outline represents the extent of contamination in 2004 before the implementation of the Supplemental RA, while the darker, smaller portions indicate the remaining areas of groundwater contamination with concentrations above the groundwater cleanup levels.

3.3 Current and Potential Future Land Use

The 1991 ROD noted that "land use in the vicinity of the Site is primarily agricultural (farms and cattle) and light residential." Based on site inspections conducted for the 2009 FYR and other Site visits, the land use characterization from the 1991 ROD remains applicable to the Site and surrounding area in 2012. There do not appear to be any land or resource use changes at or near the Site.

In April 2012 Cherokee County's Executive Director provided information to EPA confirming that the county's expectation for development in the Site area is that it will remain generally rural and light residential in character (i.e. multi-family apartments are unlikely to be built). Subdivisions in the area are few, and those present are small. Most development in the county is along Interstate 85 north of the Site. Other information from the county indicates that, while there are requirements for permits and consultation with the county when planning for construction, there is no formal "zoning" of properties for specific uses.

During 2011 the Site property was sold to a nearby home- and property-owner. The new owner has expressed to EPA and to the PRPs his interest in maintaining the rural and forested nature of the Site. As a subsequent owner of the Site property, the new owner is bound by the terms of the 2009 restrictive covenant that is now part of the Site remedy.

3.4 Summary of Site Risks

In 1991 the ROD stated that during the RI/FS, the Baseline Risk Assessment found that excess human health risks would be present in an assumed future-use scenario in which groundwater was used as a drinking water source. Risk was not found to exist under the then-current land use scenario, which included Site resident and trespasser contact with soils, but no usage of groundwater. At this time (2012) the situation with respect to future risks is unchanged. As described above, Site-area land use is similar to the characteristics documented in 1991, and the potential for the installation of groundwater wells for potable water supply remains.

In May 2009, the PRPs implemented institutional controls for this Site in the form of a restrictive covenant. The covenant restricts designated land uses by prohibiting any residential use and educational use for children/young adults in kindergarten through twelfth grade; prohibiting the use of groundwater for any purpose until drinking water standards are met; and prohibiting any activity at the Site that may impede implementation of the remedy. The restrictive covenant is recorded at the Cherokee County Courthouse in Gaffney, SC.

As part of the 2009 FYR, EPA conducted a review of all toxicity information developed in the Baseline Risk Assessment and presented in the 1991 ROD. Changes to certain COCs' cancer slope factors and hazard quotients were noted and assessed, to include recalculation of risk levels. Two COCs had been assigned cleanup goals in the 1991 ROD on the basis of Proposed

MCLs; those MCLs were later finalized during the 1990s at the same levels used for the cleanup goals. The MCL for a third COC, chloroform, was later revised to a different, lower value than was presented in the 1991 ROD (see Table 1 of this AROD). After considering these points and other information, the review's conclusions were that no other changes should be made by EPA to the Site groundwater cleanup goals.

3.5 Remedial Action Objectives and Cleanup Levels

As described above, the Proposed Plan issued by EPA in February 1991 set forth the Remedial Action Objectives (RAOs) for the Site. RAOs were not specifically discussed by name in the 1991 ROD, although the risk assessment and ARAR sections of the ROD described the objectives that would apply to the Site cleanup.

No changes to the Site RAOs are made by this Amended Record of Decision. To clarify, the RAOs for the Site are:

Groundwater:

1. Restore COC contaminated groundwater throughout the plume to concentrations that allow beneficial use (drinking water).
2. Reduce or eliminate the potential for contaminated groundwater to impact beneficial uses of groundwater in areas near the Site.
3. Manage and monitor the migration of on-site groundwater to prevent the discharge of site-related COCs to surface water.

Soil (source control):

1. Prevent migration of chemical residues from unsaturated soils into the groundwater system.

As noted earlier, no changes are contemplated for the 1991 ROD soil remedy component.

No changes to the Site RAOs or cleanup levels are made by this Amended Record of Decision. Based on the information considered in sections 3.3 and 3.4 above, the basis and rationale for the Site RAOs remains unchanged from the 1991 ROD.

The Site RAOs address the human health risks identified in the Baseline Risk Assessment by focusing the Remedial Action on achieving the Site cleanup levels; so that groundwater is restored to its beneficial use as a drinking water source.

3.6 Principal Threat Wastes

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (40 CFR § 300.430(a)(l)(iii)(A)). Identifying principal threat waste combines concepts of both hazard and risk. In general, principal threat wastes are those "source" materials considered to be highly toxic or highly mobile, which generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. The 1991 ROD stated that the preference for treatment to address the principal threats posed by the Site was satisfied by the inclusion of soil vapor extraction (SVE) in the remedy, to remediate VOC-impacted subsurface soil. Because soil cleanup operations have been completed, and because the 1983 Removal Action removed all hazardous wastes and contaminated soil at the ground surface, no principal threat wastes remain at the Site. Contaminated groundwater at the Site is the focus of the remedy documented in this Amended Record of Decision. Although contaminated groundwater is not considered to be principal threat waste, under this amendment contaminated groundwater will be treated. Therefore, this amended remedy meets the statutory preference for treatment.

4.0 Description of Alternatives

This section provides descriptions of five remedial alternatives developed for the site in the Focused Feasibility Study (FFS). The five alternatives are:

Alternative	Name
1	No Action
2	Monitored Natural Attenuation (MNA)
3	Groundwater Recovery, Treatment, Discharge
4	Enhanced Reductive Dechlorination (ERD)
5	In-Situ Chemical Oxidation (ISCO)

4.1 Original Selected Groundwater Remedy from 1991 ROD: Alternative GWC-3A, Recovery and Treatment of Groundwater Across Entire Site Using Air Stripping

The groundwater remedy selected from among the remedial alternatives and set forth in the 1991 ROD was Alternative GWC-3A, "Recovery and Treatment of Groundwater Across Entire Site Using Air Stripping." The groundwater remedy was described as having these components:

1. Construction and operation of a groundwater pump-and-treat system:
2. Extraction of contaminated groundwater;
3. On-site treatment of extracted groundwater via air stripping, with the need for controlling air stripper emissions to be evaluated in the remedial design;
4. Off-site discharge of treated groundwater to Jones Creek via a National Pollution Discharge Elimination System (NPDES) permit; and
5. Continued analytical monitoring of groundwater and surface water.

As noted earlier, during the RD it was determined that treatment of air emissions from the SVE system, and from the air stripping tower component of the groundwater system, would not be required. An ESD was issued in 1993 to document this decision.

Total present worth costs for Alternative GWC-3A, which became the Selected Remedy, were $1.9 million (in 1991 dollars). The total time period of operation required to complete the cleanup was estimated at 30 years.

A comparison of this original groundwater remedy (1991) to the five 2012 groundwater remedial alternatives below can readily be made based on the fact that Alternative 3, Groundwater Recovery, Treatment and Discharge, is essentially the same as the 1991 groundwater remedy. The one difference is that Alternative 3 envisions re-starting pumping operations of the existing groundwater pump-and-treat system, rather than including the construction of a new system. The other four components listed above still apply to Alternative 3, making the two alternatives essentially the same.

4.2 Common Elements of 2012 Alternatives

The remedial alternatives share a common CERCLA requirement that, if selected for use in a cleanup, an alternative must comply with all requirements and standards under federal, or more stringent state environmental laws and regulations that are applicable or relevant and appropriate (*i.e.*, ARARs) to the hazardous substances or particular circumstances at a site. The requirement applies unless such ARAR(s) is/are waived under CERCLA Section 121(d) (4). Tables 2 and 3 identify the Site-specific ARARs for all of the remedial actions considered for use in this amendment.

Key ARARs that apply or are relevant to particular alternatives are identified in the alternative descriptions below. ARARs are further discussed in a general sense at section 5.1 below.

All of the alternatives include the following components:

1. *Periodic monitoring of Site groundwater and surface water.* Monitoring includes conducting field sampling events, laboratory analysis of samples and reporting analytical results to EPA and SCDHEC. Maintenance of the two existing Site permits and overall project management and reporting to EPA and SCDHEC are also included in this component.

2. *Maintenance of existing institutional controls (land use restrictions) that are already in place.* As noted in section 2.2.2, in 2010 an ESD was issued in 2010 which placed institutional controls (ICs) on the property as part of the groundwater remedy. The IC consists of a restrictive covenant on the property deed that prevents use of the groundwater until cleanup levels are met, and prohibits any activity at the Site that may impede implementation of the remedy. The purpose of the ICs was to prevent human exposure to contaminated groundwater. Based on Site conditions, additional ICs are unlikely to be needed.

3. A *$25,000 cost every five years for supporting EPA's conduct of a Five-Year Review (FYR).* The FYR is a report that reviews and evaluates the progress of the cleanup action. Five-Year Reviews are required under Superfund when hazardous substances remain at a Site above levels that would allow for unlimited use and unrestricted exposure.

4. *Site maintenance activities.*.Contact and communication is maintained with Site property owner. Periodic mowing of the main, grassy open-field portion of the Site is necessary. Also performed are routine inspections of Site access roadways, monitor and injection wells, treatment and storage sheds, and equipment.

Costs for each of the five remedial alternatives are described below using the following terms. *"Capital costs"* are one-time, up-front expenditures necessary to implement the alternative. *"Annual operations/maintenance (O&M) costs"* are those expended each year over the estimated necessary time period to meet cleanup levels. *"Net present worth cost"* is a useful comparative financial analysis that gives the total cost of an alternative, capital costs added to annual costs, that will be expended over the full time period of its implementation, in terms of today's dollar value. A 7% discount rate was used to project net present worth costs. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

The "estimated time to Achieve RAOs" presented below for each alternative reflects EPA's best current judgment, based on Site data and on experience with the remedial technologies currently available. Inevitably, there is an unavoidable degree of uncertainty about how much time would be required to attain the groundwater cleanup levels and the RAOs.

4.3 Alternative 1: No Action

Estimated Capital Cost: None
Estimated Annual O&M Cost: $32,000
Estimated Net Present Worth Cost: $452,300
Estimated Construction Timeframe: none
Estimated Time to Achieve RAOs: Unknown

Under the No Action alternative, the Site is left "as is" and no funds are expended for the control or cleanup of the contaminated groundwater. If no action is taken, future risks to potential persons living on or working at the Site will persist for an unknown period of time.

Although no funds would be expended for cleanup, funds would be required for monitoring groundwater contaminant concentrations in order to conduct Five-Year Reviews. For this reason the anticipated cost of the "No Action" alternative is not zero.

4.4 Alternative 2: Monitored Natural Attenuation

Estimated Capital Cost: None
Estimated Annual O&M Cost: $111,700
Estimated Net Present Worth Cost: $1.44 million
Estimated Construction Timeframe: none
Estimated Time to Achieve RAOs: 30 years

"Natural Attenuation" refers to natural processes by which microbes (microscopic life-forms such as bacteria) break-down VOCs including those which are present at the Site, in addition to other naturally-occurring processes that can reduce COC levels. Site data indicate that such processes are occurring in the groundwater at the Site. "*Monitored* Natural Attenuation," or MNA, refers to an EPA-approved protocol by which the occurrence and rate of MNA are carefully documented, so that it can be employed as a groundwater cleanup technology.

Employing MNA consists of conducting a detailed and systematic program of periodic groundwater and surface water monitoring to gauge and assess the site-wide distribution of COC concentrations and potential migration pathways. This would be done according to an EPA-approved Site-specific work plan. The primary guidance for the work plan will be EPA's MNA guidance document. There are significant differences compared to other, more routine groundwater monitoring, such as the need to have samples analyzed for additional, natural-attenuation-specific physical and chemical parameters. Monitoring is performed and reported in order to track progress and document reductions in the site-wide distribution of COCs. The MNA groundwater monitoring network would generally consist of the existing surface water and groundwater monitoring points that have been installed throughout the Site property. These sampling points have been used during implementation of the groundwater contingency measure since 2004.

Certain ARARs would govern activities under this alternative (Table 3). ARARs concerning land-disturbance for installing monitoring wells, installation of such wells, and handling of cuttings, drilling fluids and purge water from installation of such wells, will apply to these specific actions. Installation of monitoring wells is not anticipated under this alternative, but it is possible that well installations could be performed as part of implementing the alternative.

This alternative would not require incurring time or costs for any construction. Annual O&M costs would total approximately $111,700. An estimated 30 years would be required to meet the groundwater cleanup levels and RAOs.

4.5 Alternative 3: Groundwater Recovery and Treatment

Estimated Capital Cost: $165,000
Estimated Annual O&M Cost: $343,400
Estimated Net Present Worth Cost: $3.5 million
Estimated Construction Timeframe: 3-5 months
Estimated Time to Achieve RAOs: 20 years

Under this alternative, groundwater pumping and treatment as conducted between 1995 and 2004, which was the original remedy from the 1991 ROD, would be resumed. The existing pumping wells and water treatment system would be retrofitted, upgraded, and restarted to resume site-wide groundwater capture, in order to attempt further VOC concentration reduction within the remaining areas of residual groundwater contamination. After treatment, groundwater would (as before) be discharged to Jones Creek via the existing NPDES discharge outfall.

ARARs that relate to discharge of treated groundwater from the on-site treatment unit would govern the cleanup activities. Those that focus on handling the air-stripper unit treatment residuals, if any are generated, would also apply (characterization, transport, disposal).

Significant construction (capital) costs would be incurred to bring the pump-and-treat system back up to operating efficiency, likely requiring 3-5 months. Significant O&M costs (including treatment, utilities, and contractor oversight/maintenance/reporting) would resume, at an estimated $343,400 annually. An estimated 20 years would be required to meet the groundwater cleanup levels and RAOs.

4.6 Alternative 4: Enhanced Reductive Dechlorination

Estimated Capital Cost: $150,000
Estimated Annual O&M Cost: $245,000
Estimated Present Worth Cost: $1.51 million
Estimated Construction Timeframe: 6 months
Estimated Time to Achieve RAOs: 10 years

The Enhanced Reductive Dechlorination (ERD) alternative comprises continuing the Supplemental RA actions which have been employed at the Site since late 2004. As described above (section 2.3.2), ERD is an active treatment process for groundwater. Treatment events begin with the injection of a nutrient (lactate) solution into the affected groundwater, through one or more wells. The lactate solution has two effects: 1) provides a food source that fosters the growth and activity of microbial populations that consume (breakdown) the Site COCs, and 2) causes chemical conditions to become more favorable for such growth and activity. The resultant break-down activity is the same as described above with MNA, but it is enhanced by adding the lactate to the substrate through treatments. After injection, a rest period follows during which groundwater flow distributes the solutions in the groundwater, followed by a groundwater sampling event to determine the degree, and horizontal/vertical extent, of the treatment.

ERD is an in-situ treatment that requires effective delivery of the nutrient solutions to all portions of the affected aquifer in order to be successful. Anything that limits effective, widespread distribution of the injected solutions in the aquifer can reduce the overall degree of success. Subsurface geological constraints such as low aquifer permeability and porosity, or regions of preferred and impeded groundwater flow, are commonly encountered when implementing injection-based treatments like ERD or ISCO. Experience to date with ERD at the Site indicates that certain regions of the aquifer are less-easily treated and have not had COC levels reduced to the same degree as observed in other regions of the aquifer. However, Site data also indicate these problems can likely be overcome by expanding the injection system infrastructure, and by performing repeat treatments in recalcitrant areas.

Key ARARs (Table 3) for implementing ERD are those related to the Underground Injection Control (UIC) regulations. These concern the installation, use and abandonment of injection wells. If monitoring wells are added to the Site groundwater monitoring network, the ARARs applicable to those actions and to land-clearing and disturbance activity, will also come into play. Finally, if the use of Site groundwater for mixing treatment solutions leads to generation of excess water that is then discharged to Jones Creek via the Site NPDES permit, then ARARs concerning water discharged from a water treatment unit, will apply.

The capital costs shown above are allocated towards an expansion of the injection system infrastructure, which includes three additional injection wells in a portion of the site lacking suitable well coverage. The expansion will require an estimated 6 months. The FFS estimated that a five-year period of annual injection treatments, comprising 5 treatments and the associated monitoring and reporting, would be necessary to reach the cleanup levels, followed by a five-year groundwater monitoring period. Thus 10 years total would be required to meet the cleanup levels and RAOs. Annual O&M costs would be approximately $245,000 but would decrease beyond the five-year point as the cleanup moved into the monitoring period. During those years, the annual O&M cost would not include the injection treatments. .

4.7 Alternative 5: In-Situ Chemical Oxidation

Estimated Capital Cost: $375,000
Estimated Annual O&M Cost: $408,400
Estimated Present Worth Cost: $1.97 million

Estimated Construction Timeframe: 6 months
Estimated Time to Achieve RAOs: 10 years

In-Situ Chemical Oxidation (ISCO) involves the injection of treatment solutions into the affected groundwater in a similar manner as those performed during implementation of ERD (above). In this case however, the solutions contain strong chemical oxidizers capable of chemically degrading the COCs. The breakup of the COCs is a direct chemical effect, which does not involve microbiological activity as with Alternatives 2 and 4. As with Alternative 4 (ERD) above, the process involves a rest period following injection, followed in turn by groundwater sampling to evaluate results.

As with ERD, ISCO is an in-situ treatment that requires effective delivery of the nutrient solutions to all portions of the affected aquifer in order to be successful. Anything that limits effective, widespread distribution of the injected solutions in the aquifer can reduce the overall degree of success. Subsurface geological constraints such as low aquifer permeability and porosity, or regions of preferred and impeded groundwater flow, are commonly encountered when implementing injection-based treatments.

In similar fashion to Alternative 4 above, ERD, the relevant ARARs (Table 3) for implementing ISCO are those related to the Underground Injection Control (UIC) regulations. These concern the installation, use and abandonment of injection wells. If monitoring wells are added to the Site groundwater monitoring network, the ARARs applicable to those actions and to land-clearing and disturbance activity, will also come into play. Finally, if the use of Site groundwater for mixing treatment solutions leads to generation of excess water that is then discharged to Jones Creek via the Site NPDES permit, then ARARs concerning water discharged from a water treatment unit, will apply.

Capital costs for ISCO include a Pilot Study (testing on how best to employ the technology, $75,000), and a larger cost ($300,000) to construct a suitable treatment infrastructure (pipes, lines, wells) to deliver the treatment solutions into the affected aquifer. The FFS estimated that a three-year period of annual injection treatments (3 treatments) would be necessary, followed by a seven-year groundwater monitoring period. Thus 10 years total would be required to meet the groundwater cleanup levels and RAOs. As with Alternative 4, ERD, Annual O&M costs would be higher for the three treatment years (approximately $408,000) but would then decrease beyond the three-year point as the cleanup moved into the monitoring period.

4.8 Changes in Expected Outcomes

Implementation of any of the remedial alternatives except Alternative 1, No Action, would be expected to lead to attainment of the groundwater cleanup levels and RAOs. Therefore, no changes in the expected outcomes of the groundwater cleanup action are foreseen, in comparison to the original 1991 ROD.

5.0 Evaluation of Remedial Alternatives

CERCLA and the NCP (40 CFR § 300.430(f)(i)) require that potential remedial alternatives for Superfund remedial actions be evaluated and compared using nine specific evaluation criteria. The nine criteria fall into three groups.

Threshold Criteria are those that any alternative must meet in order to be selected by EPA as the Site Remedy. The two threshold criteria are:

- Overall protection of human health and the environment, and
- Compliance with ARARs.

Balancing Criteria include five additional criteria that are used to identify and highlight the different strengths and weaknesses each alternative has. From among alternatives that meet the two threshold criteria above, EPA uses the varying degrees to which the alternatives meet the balancing criteria as the basis for making the judgments needed to select a preferred alternative. The five balancing criteria are:

- Long-term effectiveness and permanence,
- Reduction of mobility, toxicity, or volume through treatment,
- Short-term effectiveness,
- Implementability, and
- Cost.

Modifying Criteria are used by EPA to consider modifying its choice of a remedial alternative depending on whether, and to what degree, both the State and the local community agree with EPA's recommendation that a remedial alternative be chosen as the Site Remedy. These criteria can be fully considered only after public comment is received on the Proposed Plan. In the balancing of alternatives' strengths and weaknesses upon which the final remedy selection is based, modifying criteria are of equal importance to the balancing criteria. EPA may modify or change the preferred alternative in response to State or local comments. The two modifying criteria are:

- State acceptance, and
- Community acceptance.

The evaluation criteria, and how the alternatives compare to each other on them, are described further below.

5.1 Threshold Criteria

Overall protection of human health and the environment considers whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

Alternatives 2, 3, 4, and 5 would be expected to meet this criterion when implemented properly. Each does this through direct, active treatment of groundwater, although the method of treatment varies. Alternatives 4 and 5 reduce threats by directly treating groundwater in-situ and reducing its toxicity through treatment by enhanced reductive dechlorination (ERD) or in-situ chemical degradation (ISCO). Alternative 3 accomplishes treatment through the hydraulic capture of the affected groundwater, followed by on-site treatment of the water using an air stripping unit, before it is returned to Site surface water under the existing NPDES permit. In the case of Alternative 2, MNA, the treatment occurs through natural processes alone, but is monitored using an EPA-approved protocol to ensure eventually reaching the groundwater cleanup levels.

In the case of Alternative 1, No Action, should Site groundwater improve due to natural processes alone, then the alternative might at some future point meet the cleanup levels (and thus meet this criterion and the ARARs requirement below). However, whether and when this will occur is unknown.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) **considers** whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that apply to the Site, or whether a waiver is justified.

Section 121(d) of CERCLA, as amended, specifies in part that remedial actions for cleanup of hazardous substances must comply with requirements and standards under federal or more stringent state environmental laws and regulations that are applicable or relevant and appropriate (*i.e.*, ARARs) to the hazardous substances or particular circumstances at a site unless such ARAR(s) is/are waived under CERCLA Section 121(d) (4). ARARs include only federal and state environmental or facility siting laws/regulations and do not include occupational safety or worker protection requirements. Compliance with OSHA standards is required by 40 CFR § 300.150 and therefore the CERCLA requirement for compliance with or wavier of ARARs does not apply to OSHA standards.

Under CERCLA Section 121(e)(1), federal, state, or local permits are not required for the portion of any removal or remedial action conducted entirely 'on-site' as defined in 40 CFR § 300.5. *See also* 40 C.F.R. §§ 300.400(e)(1) & (2). Also, CERCLA response actions must only comply with the "substantive requirements," not the administrative requirements of a regulation or law. Administrative requirements include permit applications, reporting, record keeping, inspections, and consultation with administrative bodies. Although consultation with state and federal agencies responsible for issuing permits is not required, it is often recommended for determining compliance with certain requirements such as those typically identified as Location-Specific ARARs.

Applicable requirements, as defined in 40 CFR § 300.5, means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstance at a CERCLA site. Only those state standards that are identified by the state in a timely manner and that are more stringent than federal requirements may be applicable. *Relevant and appropriate requirements,* as defined in 40 CFR § 300.5, means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the particular site. Only those state standards that are identified by the state in a timely manner and that are more stringent than federal requirements may be relevant and appropriate.

In accordance with 40 CFR § 300.400(g)(5), only those state standards that are promulgated, are identified in a timely manner, and that are more stringent than federal requirements may be applicable or relevant and appropriate. For purposes of identification and notification of promulgated state standards, the term promulgated means that the standards are of general applicability and are legally enforceable. State ARARs are considered more stringent where there is no corresponding federal ARAR, where the State ARAR provides a more stringent concentration of a contaminant, or the where a State ARAR is broader in scope than a federal requirement.

In addition to ARARs, the lead and support agencies may, as appropriate, identify other advisories, criteria, or guidance to be considered for a particular release that may be useful in developing Superfund remedies. The "to-be-considered" (TBC) category consists of advisories, criteria, or guidance that were developed by EPA, other federal agencies, or states that may assist in determining, for example, health-based levels for a particular contaminant for which there are no ARARs or the appropriate method for conducting an action. TBCs are not considered legally enforceable and, therefore, are not considered to be applicable for a site but typically are evaluated along with Chemical-specific ARARs as part of the risk assessment to determine protective cleanup levels.

In accordance with 40 CFR § 300.400(g), EPA and the State of South Carolina have identified the potential ARARs and TBCs for the evaluated alternatives. Tables 2 and 3 list, respectively, the Chemical- and Action-Specific ARARs/TBCs for remedial actions in the evaluated alternatives.

ARAR Categories

For purposes of ease of identification, EPA has created three categories of ARARs: Chemical-, Location- and Action-Specific. Under 40 CFR § 300.400(g)(5), the lead and support agencies shall identify their specific ARARs for a particular site and notify each other in a timely manner as described in 40 CFR § 300.515(d). Chemical- and Location-Specific ARARs should be identified as early as the scoping phase of the Remedial Investigation, while Action-Specific ARARs are identified as part of the Feasibility Study for each remedial alternative.

Chemical-Specific ARARs/TBC Guidance: Chemical-Specific ARARs are usually health or risk based numerical values limiting the amount or concentration of a chemical that may be found in, or discharged to, the environment. The Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs) at 40 CFR Part 141 and the state or federal ambient water quality criteria established under Section 303 or 304 of the Clean Water Act (CWA) are examples of Chemical-Specific ARARs used to establish remediation levels for restoration of groundwater that are current or potential sources of drinking water and restoration of surface water to meet its designated uses or classifications, respectively.

Table 2 lists Chemical-Specific ARARs for the Site, which includes SDWA MCLs for some of the groundwater COCs at the Site. In the absence of an MCL or other Chemical-Specific ARARs, site-specific risk-based remedial goals were developed for the groundwater COCs (see Table 1).

Action-Specific ARARs/TBC Guidance: Action-specific ARARs are usually technology-based or activity-based requirements or limitations that control actions taken at hazardous waste sites. Action-Specific requirements often include performance, design and controls, or restrictions on particular kinds of activities related to management of hazardous substances. Action-specific ARARs are triggered by the types of remedial activities and types of wastes that are generated, stored, treated, disposed, emitted, discharged, or otherwise managed. Potential Action-specific ARARs include RCRA waste characterization, storage and disposal requirements, RCRA and SDWA underground injection well requirements, and CWA requirements for releases of wastewater from an on-site wastewater treatment unit (WWTU) into Jones Creek.

Table 3 lists potential Action-Specific ARARs for the remedial action alternatives.

Location-Specific ARARs/TBC Guidance: Location-Specific requirements establish restrictions on permissible concentrations of hazardous substances or establish requirements for how activities will be conducted because they are in special locations (*e.g.*, wetlands, floodplains, critical habitats, streams). The 1991 ROD, in Table 20, listed 9 Federal and two State location-specific ARARs, but clearly defined each as not applying to the Site. EPA reviewed these ARARs for purposes of this amendment and has determined that the 1991 determinations were correct. Thus there are no location-specific ARARs/TBC guidances for the alternatives.

Requirements Applicable to Off-Site Activities: Any remediation wastes that are generated (e.g., excavated soils or well purge water) and subsequently transferred off-site or transported in commerce along public right-of-ways must meet any applicable requirements (including administrative portions) such as those for packaging, labeling, marking, manifesting, and placarding requirements for hazardous materials. In addition, CERCLA Section 121(d)(3) provides that the off-site transfer of any hazardous substance, pollutant, or contaminant generated during CERCLA response actions be sent to a treatment, storage, or disposal facility that is in compliance with applicable federal and state laws and has been approved by EPA for acceptance of CERCLA waste. (Requirements are defined at 40 CFR § 300.440, known as "The Off-Site Rule.")

Alternatives 2, 3, 4, and 5 all would accomplish compliance with ARARs when implemented fully and properly. Thus the alternatives, except Alternative 1 No Action, are equal under this criterion. Alternative 1, No Action, fails to comply with Federal and State ARARs that require cleanup of contaminated groundwater that is used or potentially can be used as a source of drinking water supply. In view of its failure to meet this threshold criterion and meet the "overall protection" criterion above, the No Action Alternative (Alternative 1) is not considered further below.

In summary, Alternatives 2, 3, 4, and 5 would all meet both of the two threshold criteria.

5.2 Balancing Criteria

Long-term effectiveness and permanence refers to the ability of an alternative to maintain reliable protection of human health and the environment over time, over the long term, once clean-up levels have been met.

Alternatives 4 and 5 would provide long-term effectiveness and permanence through successful treatment of the groundwater. In both cases, the treatment is permanent and irreversible. Alternative 4, ERD, uses enhanced natural break-down processes to chemically change the COCs into less-toxic and eventually non-toxic compounds. In the case of Alternative 5, ISCO, chemical treatment that destroys the COCs is accomplished through performing injections of strong chemical solutions (oxidizing solutions) and monitoring the treatment effect on groundwater. Both treatment effects occur in-situ within the aquifer.

Alternatives 2 and 3 achieve somewhat less effectiveness and permanence than Alternatives 4 and 5. Alternative 3 (Groundwater Recovery and Treatment) is effective and permanent for the groundwater that is captured by pumping. But EPA experience with pump-and-treat systems at Superfund sites, and with the original remedy at this site, has shown COC levels often "level off" while still well above cleanup levels, and that if a system is temporarily shut down, COC levels will often "rebound" back to higher levels. These features call the long-term effectiveness of Alternative 3 into question.

With Alternative 2 (MNA), the passive treatment effect on groundwater is permanent. However, without active or direct groundwater treatment, there is slightly more uncertainty that natural conditions suitable for continued natural attenuation will prevail over the long term. The treatment would also be expected to require more time (30 years).

Reduction of toxicity, mobility or volume through treatment is a consideration of whether, and to what degree, an alternative uses treatment to reduce the harmful effects of the Site COCs, their ability to move in the environment, and the volume of contamination present.

Alternatives 2, 3, 4, and 5 all would accomplish reduction of these characteristics. However, under Alternative 2 (MNA) the degree of these reductions is slightly less, and achieving the reductions slightly less certain, than it is for Alternatives 4 (ERD) and 5 (ISCO). This is because with active treatment (ERD, ISCO), there is the potential for achieving greater reductions in less time, or targeted reductions in specific parts of the aquifer. MNA (Alternative 2) by comparison is a passive treatment process, relying on the ongoing natural processes in the aquifer to complete the groundwater cleanup. In the case of Alternative 3 (Groundwater Recovery and Treatment), recovery (pumping) and treatment of the affected groundwater would quickly reduce its mobility and volume. However, this is offset negatively by past experience at the Site when the original remedy was implemented and data showed that COC concentrations leveled off at a point well above the groundwater cleanup levels, leaving the toxicity of the COCs unaffected below certain concentrations.

Alternatives 4 and 5 provide the most certainty for this criterion because you are directly treating the contaminated media. The in-situ groundwater treatment technologies (ERD, ISCO) directly and permanently reduce the mobility, toxicity, and volume through treatment.

Short-term effectiveness considers the length of time needed to implement an alternative. It also considers whether the alternative presents any risks to workers, residents, and the environment during implementation.

Alternatives 4 (ERD) and 5 (ISCO) would require the least time (10 years) to achieve the groundwater cleanup levels, compared to Alternatives 2 and 3. However, Alternative 5 could involve short-term health risks to workers who will be handling the strong chemicals needed to prepare the treatment solutions for implementing ISCO. Alternative 3 (Groundwater Recovery and Treatment) would initially achieve some fast reductions in COC levels in groundwater wells; however, past experience suggests that concentrations would reach "level off" and stop decreasing, thus lengthening the time needed (20 years) to meet the groundwater cleanup levels. Alternative 2 (MNA) would likely require the longest time to meet the groundwater cleanup levels, estimated at 30 years.

Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

Alternatives 2 and 4 would be easiest to implement. Implementing either one would be straightforward, technically feasible, and not require new site activities.

Alternatives 3 and 5 would be somewhat less easily implemented. Alternative 3 (Groundwater Recovery and Treatment) would involve retro-fitting new pumping components into the pumping wells before operations could resume. To implement Alternative 5, ISCO, performance of laboratory or field/pilot-scale studies would be necessary in order to design the specific plans and infrastructure (i.e. pipes, lines, wells) for treating the aquifer.

Cost is a consideration of the total funds that must be expended to achieve the cleanup levels and RAOs. As described in more detail in Section 4 above, Alternatives 2 (MNA), 4 (ERD), and 5 (ISCO) have comparable costs of between $1.44 and 1.97 million. Alternative 3 (Groundwater Recovery and Treatment) is the most costly at $3.5 million. The total net present worth costs for the alternatives are:

Alternative	Total Net Present Worth Cost
Alternative 2: Monitored Natural Attenuation (MNA)	$1.44 million
Alternative 3: Groundwater Recovery and Treatment	$3.5 million
Alternative 4: Enhanced Reductive Dechlorination (ERD	$1.51 million
Alternative 5: In-Situ Chemical Oxidation (ISCO)	$1.97 million

A summary table comparing the performance of Alternatives 2, 3, 4, and 5 relative to one another on the five balancing criteria is shown below. Other than for cost, the assigned judgments describe the degree to which the alternative successfully meets the criterion.

Criterion	Alternative			
	2 MNA	3 Recovery	4 ERD	5 ISCO
Long-term effectiveness and permanence	Moderate	Moderate	High	High
Reduction of toxicity, mobility or volume	Moderate	Moderate	High	High
Short Term effectiveness	Moderate	Moderate	High	Moderate
Implementability	High	Moderate	High	Moderate
Cost	Comparable	Highest	Comparable	Comparable

5.3 Modifying Criteria

State Acceptance has been indicated by SCDHEC in the agency's support for the Selected Remedy (see Appendix A). ***Community Acceptance*** has been evaluated by EPA during the public comment period and afterwards, prior to issuing this Amended Record of Decision. EPA did not receive any public comments during or after the formal public comment period.

6.0 The Selected Remedy: Alternative 4, ERD, and Contingency Remedy: Alternative 2, MNA

The Amended Selected Remedy for cleaning up contaminated groundwater at the Medley Farm Drum Dump Superfund Site is Alternative 4, Enhanced Reductive Dechlorination (ERD).

Alternative No. 2, Monitored Natural Attenuation (MNA) is selected as a Contingency Remedy.

6.1 Rationale for Selected Remedy

EPA's rationale for choosing Alternative 4, ERD, as the Selected Remedy is evident from the comparisons made in Section 5.0 above. Alternative 4 achieves a high degree of overall protection of human health and the environment, and complies with ARARs, thus meeting the threshold criteria. Additionally, to a degree superior to or equal to the other alternatives, it provides long-term effectiveness and permanence; reduces the toxicity and volume of groundwater COCs; is effective in the short-term and is easily implementable; and is cost effective. Compared to Alternatives 2 (30 years) and 3 (20 years). The Preferred Alternative (ERD) will require less time (10 years) to reach the groundwater cleanup levels. Compared to Alternatives 3 and 5, it can be more easily implemented, and it is more cost-effective than Alternatives 3 or 5.

6.2 Selected Remedy Description

As described earlier in Section 4.6, ERD is an active treatment process for groundwater. Treatment events begin with the injection of a nutrient (lactate) solution into the affected groundwater, through one or more wells. The lactate solution has two effects: it provides a food source that fosters the growth and activity of microbial populations that consume (breakdown) the Site COCs, and it causes chemical conditions to become more favorable for such growth and activity. As a result of placing the nutrient solutions into the aquifer, reductive dechlorination, a natural process that breaks down the COCs into less-toxic and eventually non-toxic compounds, is enhanced. After injection, a rest period follows during which groundwater flow distributes the solutions in the groundwater, followed by a groundwater sampling event to determine the degree and areal and vertical extent of the treatment.

The remedy includes capital costs that will be used to expand the injection system infrastructure. At a minimum, three additional injection wells are foreseen, to be constructed in a portion of the site lacking suitable well coverage. The expansion will require an estimated 6 months. The FFS estimated that a five-year period of annual injection treatments, comprising 5 treatments and the associated monitoring and reporting, would be necessary to reach the cleanup levels, followed by a five-year groundwater monitoring period. Thus 10 years total are expected to be required to meet the remedial action objectives and cleanup levels. The remedy will be implemented until the cleanup levels are achieved.

The alternative components described in sections 4.2 and 4.6 are included in the Selected Remedy. They include periodic monitoring of Site groundwater and surface water (including maintenance of the two existing Site permits and overall project management and reporting to

EPA and SCDHEC); maintaining the existing institutional controls; a $25,000 cost every five years for supporting EPA's completion of a FYR; and continuing Site maintenance activities. Sampling for natural attenuation parameters to support the transition to MNA, if needed in the future, is also included in the Selected Remedy.

In summary, the components of the Selected Remedy are:

- Design and construct the expansion of the injection system infrastructure
- Implement five ERD injection treatments over five years;
  Conduct associated groundwater monitoring to ensure ERD effectiveness and efficiency and verify natural attenuation parameters;
- Continue periodic monitoring of Site groundwater and surface water to verify achievement of groundwater cleanup levels (to include maintenance of existing Site permits and overall project management and reporting to EPA and SCDHEC);
- Maintain, monitor and enforce existing institutional controls (land and groundwater use restrictions);
- Support EPA's conduct of Five-Year Reviews, to ensure protectiveness of the remedy; and,
- Continue Site maintenance activities.

Costs for the selected remedy are discussed in Section 6.4 below.

6.3 Contingency Remedy Description

Alternative No. 2, Monitored Natural Attenuation (MNA), is selected for use as a Contingency Remedy. The rationale for selecting MNA for this purpose is evident from considering the comparisons made in Section 5.0 and summarized in the chart at the end of Section 5.2 above. The rationale has a Site-specific component. Groundwater monitoring data collected to date at the Site indicate that reducing conditions, suitable for natural reductive dechlorination processes to take place, prevail in many areas of the aquifer for a considerable length of time after the treatment solutions have become dispersed in the aquifer. This indicates that suitable conditions for effective MNA to occur may be sustained over long periods of time. Under these circumstances and in accord with EPA's MNA guidance, MNA can be considered as a means to further reduce, at a predictable and steady rate, the concentrations of COCs in site groundwater.

As described in EPA guidance, a Contingency Remedy serves as a backup remedy in the event that a Selected Remedy cannot meet the established site-specific cleanup goals or meet them in the expected length of time required. In this case, MNA would then become the best choice for completing groundwater cleanup at the Site. Therefore MNA would be a selected as a finishing step to achieve cleanup levels should ERD not be able to meet them.

It is EPA's intention and expectation that the Selected Remedy, ERD, will achieve the cleanup levels, and additionally promote conditions conducive for natural attenuation. Current Site data indicate the most likely cause for ERD not achieving cleanup levels in the expected time frame is the inability to overcome subsurface geological constraints such as low aquifer permeability and porosity, and the presence of regions of impeded groundwater flow, which act to prevent adequate distribution of the injected solutions in the aquifer. Both ERD and MNA cleanup processes rely on certain geochemical conditions that are favorable for reductive dechlorination (a major component of natural attenuation) to occur, and Site data and results to date indicate that these conditions will persist for long periods after the ERD treatment solutions have become dispersed in the aquifer. After implementation of the ERD injections, if contaminant levels do not decline to below the cleanup levels after the expected period of time, EPA will evaluate site conditions and determine if conditions are favorable for, and meet the proper conditions for, a transition to MNA. Throughout the ERD implementation period, sampling will be conducted to obtain the lines of evidence for MNA as recommended and required by EPA's MNA guidance.

Use of MNA as the Contingency Remedy will be performed in a manner that complies with EPA's MNA guidance document, *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites,* OSWER Directive 9200.4-17P (1999).

In accordance with the EPA MNA guidance, EPA's approval for Contingency use of MNA will require demonstrating that existing, ongoing natural attenuation processes will bring Site groundwater COC levels below the cleanup goals in an acceptable length of time. The Contingency Remedy, should it be needed, will be invoked by EPA issuing an Explanation of Significant Differences (ESD). The ESD may be for a portion of the Site or the entire Site.

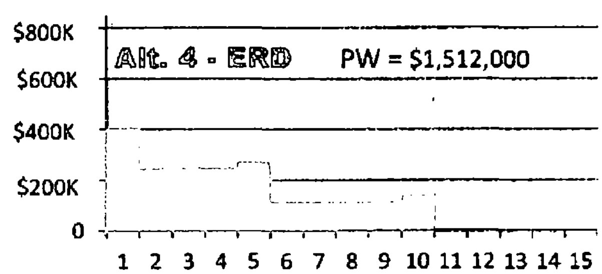
In summary, the components of the Contingency Remedy are:

- ◊ Implement a detailed and systematic program of periodic groundwater and surface water monitoring, following EPA's MNA Guidance, for an anticipated period of 30 years or as approved by EPA;
- ◊ Maintain, monitor and enforce existing institutional controls (land and groundwater use restrictions);
- ◊ Support EPA's conduct of Five-Year Reviews, to ensure protectiveness of the remedy; and,
- ◊ Continue Site maintenance activities.

6.4 Cost Estimate for Selected Remedy

Table 4 presents a detailed cost estimate for the amended Selected Remedy. The costs listed in the table, approximately $245,000, reflect all costs expected for the first year of O&M. However, as described for Alternative 4 (ERD) in Section 4.6 above, there will be a one-time capital cost for the first year, for expansion of the injection infrastructure of $150,000. Those capital costs apply only to the first year, thus they are not included in the $245,000 annual cost total on Table 4. Because of the requirement for FYRs, years 5 and 10 include the $25,000 cost for the FYR, also not included in the table's annual cost total.

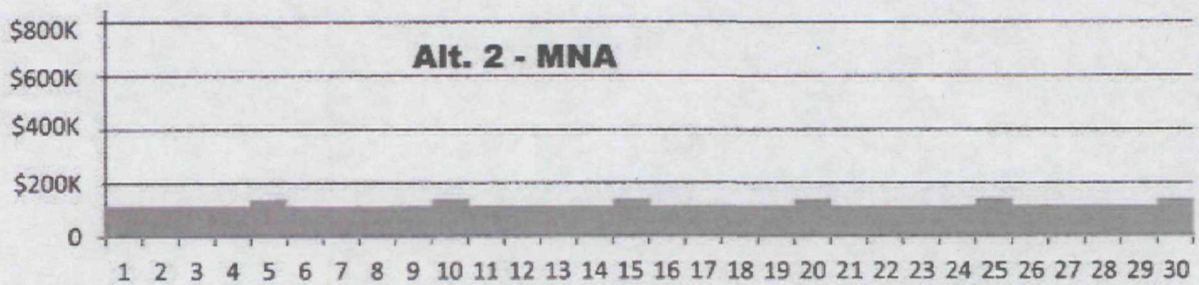
The diagram at right illustrates how the anticipated costs are expended across the expected 10-year period. When the costs in Table 4, plus the 5YR costs, are discounted at 7% across all 10 years, the total net present worth cost (total cost) rises to a total of $1,512,000.



6.5 Cost Estimate for the Contingency Remedy

Table 5 presents a detailed cost estimate for the Contingency Remedy. The costs listed in the table, approximately $111,700, reflect all costs that would be expected for the first year of O&M. Because of the requirement for FYRs, years 5, 10, 15, 20 and 25 include a $25,000 cost for the FYR, a cost not shown in the annual cost total on the table.

The graphic below illustrates how the anticipated costs would be expended across a projected 30-year period. The O&M and 5YR costs are then discounted at 7% across the 30 years to give a total net present worth cost.



However, because the selected remedy, ERD, is being implemented first, the actual costs incurred for the Contingency Remedy if it is invoked will be less than this total. The cost total will depend on when the Contingency Remedy is invoked. Assuming the Selected Remedy, ERD, is implemented over 10 years before the Contingency Remedy is invoked, the O&M costs for years 1 to 10 would not be expended, nor the costs for 5YRs on year 5 and year 10. Subtracting each of these costs, discounted at 7%, from the net present worth cost total shown for MNA (Alternative 2) in section 4.4, results in an estimated total net present worth cost for the Contingency Remedy of $570,500.

7.0 Support Agency Comments

SCDHEC and EPA have worked cooperatively at the Medley Farm Drum Dump Site since the Site came to State attention in the early 1980s. SCDHEC project personnel have remained involved with the Site's cleanup throughout this time, and are supportive of EPA's planned actions. SCDHEC's letter concurring with this Amended Record of Decision appears in Appendix A.

8.0 Statutory Determinations

Pursuant to Section 121 of CERCLA and 40 CFR § 300.430(f)(5)(ii), the lead Agency must select remedies that are protective of human health and the environment, comply with ARARs, are cost effective, and that utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. The following sections discuss how the amended Selected Remedy and Contingency Remedy selected in this AROD meet these statutory requirements.

8.1 Protection of Human Health and the Environment

The amended Selected Remedy selected in this AROD will be protective of human health and environment. As a result of ERD treatments of groundwater, Site COCs will be converted to less soluble forms, reducing toxicity and mobility. ERD fosters reductive dechlorination, a one-way, non-reversible process that destroys the COCs by chemically changing them into other less-toxic compounds, and eventually into non-toxic compounds.

The Contingency Remedy selected in this AROD, if it is invoked for use in the future, will be protective of human health and environment. MNA relies on natural processes by which microbes break-down VOCs such as the Site COCs, in addition to other naturally-occurring processes that can reduce COC levels. When the occurrence and rate of MNA are carefully documented, EPA experience has shown that MNA can be successfully employed as a groundwater cleanup technology.

8.2 Compliance with ARARs

The amended Selected Remedy will comply with all ARARs. This will include meeting the Site cleanup goals (Table 1). ARARs for the Site are listed in Tables 2 and 3, and consist of chemical-specific and action-specific ARARs. As noted in section 5.1, there are no location-specific ARARs for the Site.

The Contingency Remedy will also comply with all ARARs, in the event it is invoked for use. This will include meeting the Site cleanup goals (Table 1). EPA's MNA guidance document (see Table 3) is a "To Be Considered" criterion.

8.3 Cost Effectiveness

The amended Selected Remedy is cost-effective. Excluding the No Action alternative, the amended Selected Remedy has a lower cost than two of the other three alternatives that meet threshold criteria, and higher than one of them, Alternative 2, MNA. While Alternative 2 MNA (the Contingency Remedy) is slightly less expensive than the amended Selected Remedy, it requires a longer period (30 years) to reach the groundwater cleanup levels. In view of these comparisons, the amended Selected Remedy provides the best overall protection in proportion to its cost. The estimated present worth cost for the amended Selected Remedy is $1,512,000.

The Contingency Remedy will also be cost-effective if it becomes necessary to invoke it. Given the comparisons made in Section 5.0 and discussed in Section 6.3, which provide the rationale for selecting MNA as the Contingency Remedy, if MNA is invoked for use it would likely be the only effective alternative remaining that could be used to attain the groundwater cleanup levels. Actual costs for MNA would be lower than projected in Section 4.6 because an assumed 10 years of treatment, and two 5YRs, would already have been performed under the amended Selected Remedy (ERD).

8.4 Permanent and Alternative Treatment Solutions

The amended Selected Remedy meets the CERCLA preference for using permanent treatment to protect human health and the environment and comply with ARARs. The treatment accomplished through the use of ERD is permanent, and destroys the COCs by chemically changing them into other less-toxic compounds and eventually into non-toxic compounds. Effects are permanent and result in the reduction of groundwater toxicity and volume.

The Contingency Remedy also meets the CERCLA preference, although the treatment is passive in comparison to the active (injection) treatments done with ERD. As with ERD, MNA takes advantage of reductive dechlorination which permanently destroys the COCs by chemically changing them into other less-toxic compounds and eventually into non-toxic compounds.

8.5 Preference for Treatment as a Principal Element

The amended Selected Remedy meets the CERCLA preference for using treatment as a principal element of the cleanup. ERD is employed as an active groundwater process in which the contaminated medium, groundwater, is affected and treated directly by the application of nutrient solutions that cause chemical changes to the groundwater. The treatment effect is to enhance ongoing and in-situ reductive dechlorination.

The Contingency Remedy, MNA, uses the same natural processes to address groundwater as does the amended Selected Remedy, ERD, as described above. However it is a passive action, rather than an active treatment, and therefore only partially meets the statutory preference for remedies that employ treatment as a principal element. However, by employing an active treatment remedy first (the amended Selected Remedy, ERD), the preference for treatment is satisfied to the maximum degree possible. Principal threat waste was previously addressed in the original ROD. Contaminated groundwater is not considered to be a principle threat waste; therefore, this amendment does not address principle threat wastes.

8.6 Five-Year Review Requirement

CERCLA Section 121 and the NCP (40 CFR Part 300), require a review (FYR) of Superfund Remedial Actions at least every five years if the action results in hazardous substances, pollutants, or contaminants remaining in place above levels that allow for unlimited use and unrestricted exposure. Because this remedy will result in hazardous substances, pollutants or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, in the form of contaminated groundwater that does not yet meet the cleanup levels, FYRs will continue to be conducted every five (5) years. The next FYR for the Site is scheduled to be completed before September 1, 2014.

8.7 Documentation of Significant Changes

Pursuant to CERCLA Section 117(b) and 40 CFR § 300.430(f) (3)(ii), the AROD must document any significant changes made to the Preferred Alternative discussed in the Proposed Plan.

The only significant change made between the Preferred Alternative discussed in the Proposed Plan and the Selected Remedy in this AROD concerns the costs presented for the Contingency Remedy, MNA. As noted in Section 6.5, the total cost for the Contingency Remedy (MNA) differs from the MNA cost shown for Alternative 2 because the selected remedy, ERD, is being implemented first. As a result, actual costs incurred for the Contingency Remedy if it is invoked will be less than shown for Alternative 2, MNA, in the Proposed Plan. Assuming the Selected Remedy, ERD, is implemented over 10 years before the Contingency Remedy is invoked, the net present worth cost total for the Contingency Remedy is expected to be $570,500.

9.0 Public Participation

On March 1, 2012, EPA staff assigned to the Site mailed out the "Proposed Plan" Fact Sheet for the Amended Record of Decision. The document was mailed to the Site's mailing list, which includes Site area residents within ½-mile of the Site as well as various County officials, and the assigned personnel at SCDHEC.

The Proposed Plan provided a brief Site history, summary of Site cleanup actions completed to date, descriptions of the different remedial alternatives that were assembled in the 2011 FFS, a comparison of those alternatives, and the identification of EPA's preferred alternative. The Fact Sheet announced a Public Comment Period which ran from March 6, 2012 to April 5, 2012. During this period EPA did not receive any public comments concerning the Proposed Plan.

An advertisement was prepared to announce the Site's Proposed Plan and the date, time and location of a public meeting to brief the local community about EPA's activities. The display ad appeared in the two local newspapers that are published by the Gaffney Ledger. On Tuesday March 13, 2012, the ad appeared in the Weekly Ledger, a large-circulation weekly (32,000 recipients per week) covering a broad area surrounding and including Gaffney. The ad ran the following day, Wednesday, March 14, 2012, in the Gaffney Ledger.

EPA held a public meeting to present the Proposed Plan to the community and seek public feedback, at 7:00 p.m. on Tuesday, March 20, 2012. Corinth Baptist Church, located about two miles from the Site, hosted the meeting in the church's gym as had been arranged with the assistance of the SCDHEC Spartanburg Office. The EPA RPM for this Site gave a PowerPoint presentation which provided information on the topics presented in the Proposed Plan. In addition to EPA and SCDHEC personnel, two local residents attended the meeting. One attendee represents the County District surrounding the Site. The other was a long-time resident living south of the Site along Burnt Gin Road. Questions and discussion after the presentation mainly concerned what the long-time resident recalled about activities at the Site in the 1980s, and current and future use of the property. The two attendees were supportive of EPA's plans at the Site. The transcript of the meeting is included in Appendix B.

Once finalized, this Amended Record of Decision will be added to the Administrative Record for the Site. The Administrative Record is available for review at the Cherokee County Gaffney Branch Library in Gaffney, South Carolina, and at the EPA Region 4 Records Center in Atlanta, Georgia:

Cherokee County Library, Gaffney Branch
300 East Rutledge Avenue,
Gaffney, SC 29340, (864) 487-2711
(Branch Hours: Mon – Thurs 9-7, Fri 9-5, Sat 9-4)

U.S. EPA Region 4, Record Center
61 Forsyth St. SW, 11th Floor
Atlanta, GA 30303
1-404-562-8946
Mon-Fri (7:30 - 4:30)

9.0 REFERENCES

EPA, 1991. U.S. Environmental Protection Agency Region 4. *Record of Decision for the Medley Farm Superfund Site, Cherokee County, South Carolina.* May 29, 1991.

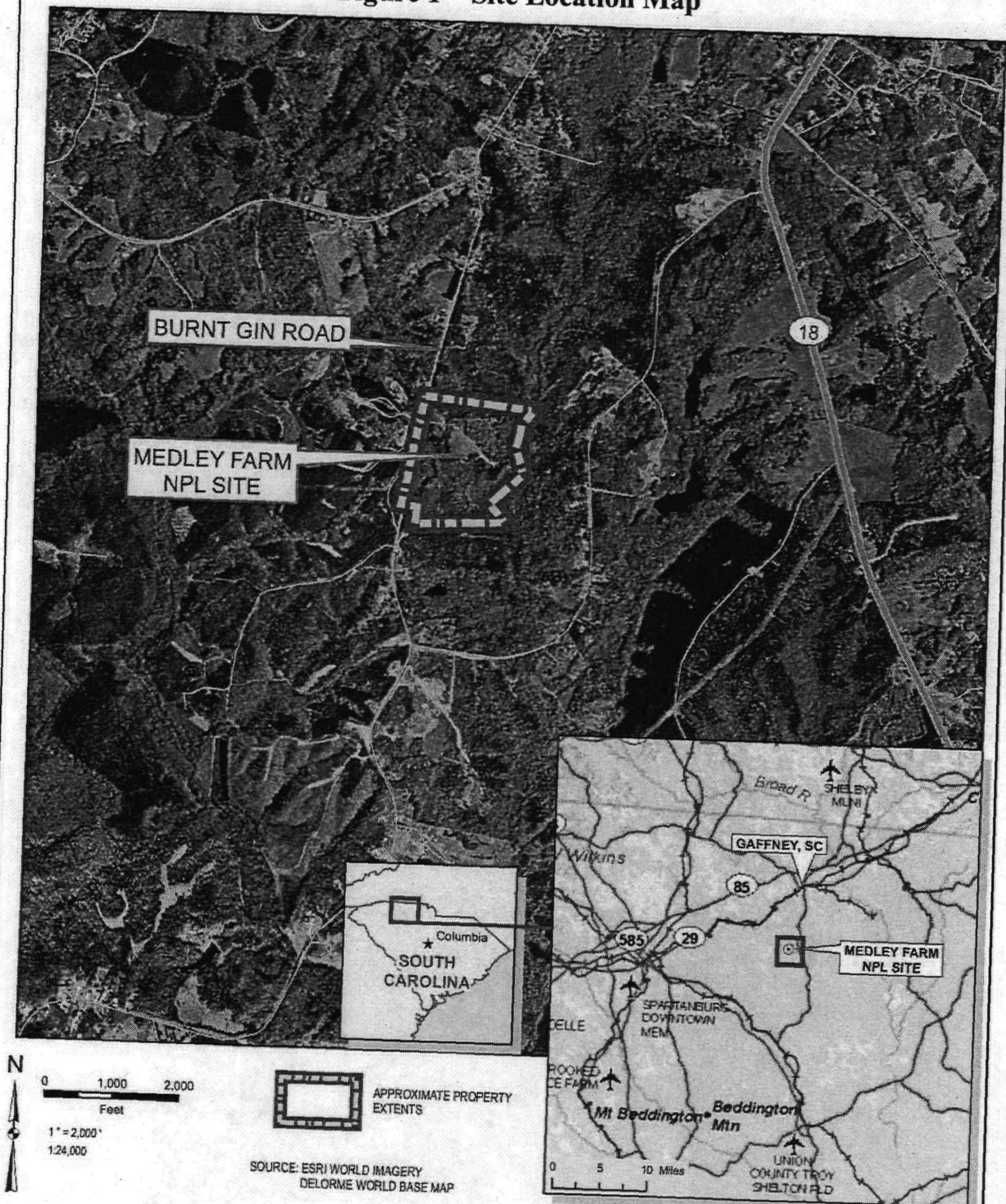
RMT, Inc., 2004. *Revised Workplan and Design Report for Reductive Dechlorination.* June 2004.

EPA, 2004. U.S. Environmental Protection Agency Region 4. *Third Five-Year Review Report, Medley Farm Drum Dump Superfund Site, Gaffney, Cherokee County, South Carolina.* September 30, 2004. (This report summarizes progress at the Site up to Sept. 2004.)

EPA, 2009. U.S. Environmental Protection Agency Region 4. *Third Five-Year Review Report, Medley Farm Drum Dump Superfund Site, Gaffney, Cherokee County, South Carolina.* September 1, 2009. (This report summarizes progress at the Site up to Sept. 2009, and includes (at Attachment D) an extensive groundwater progress review.)

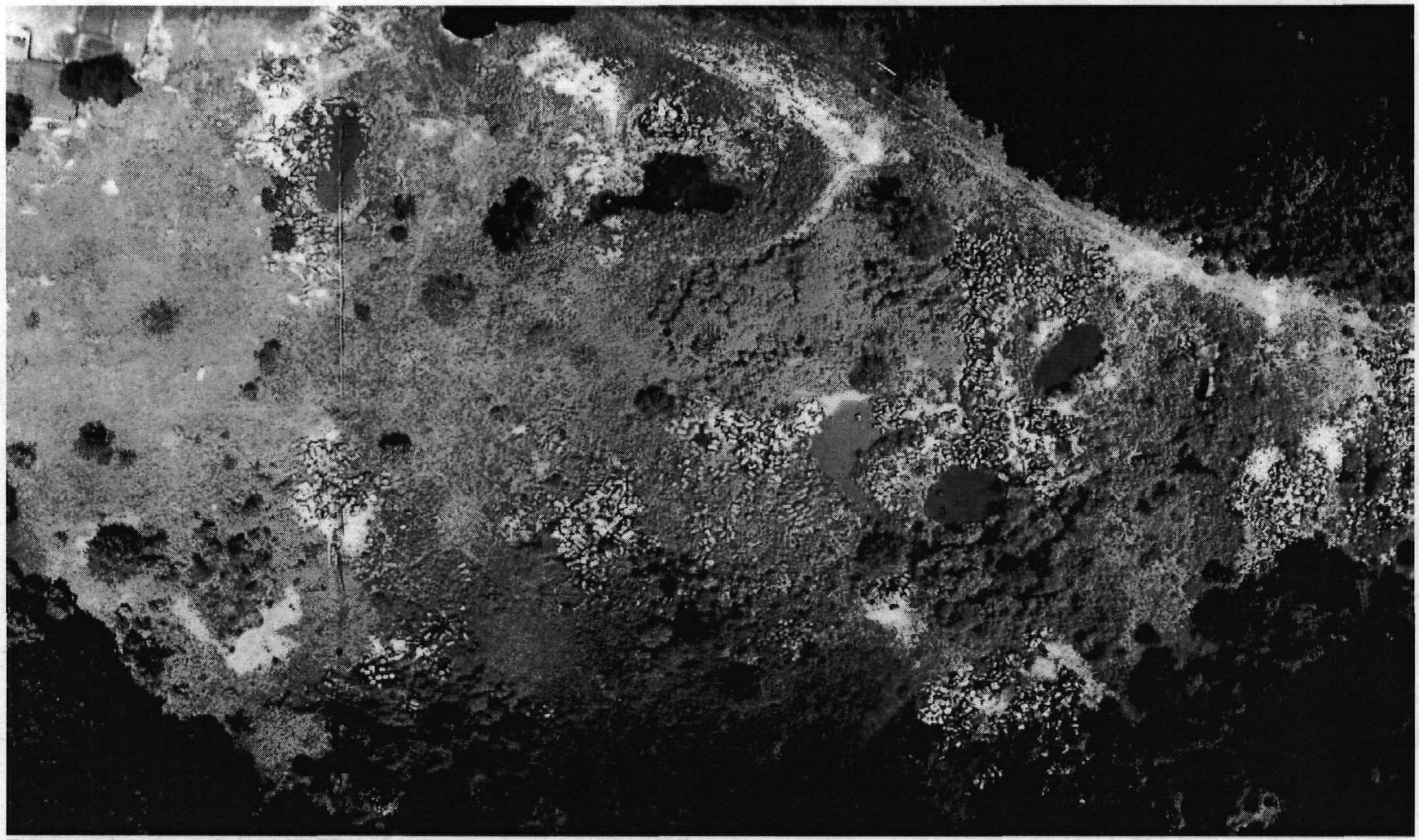
FIGURES

Figure 1 – Site Location Map



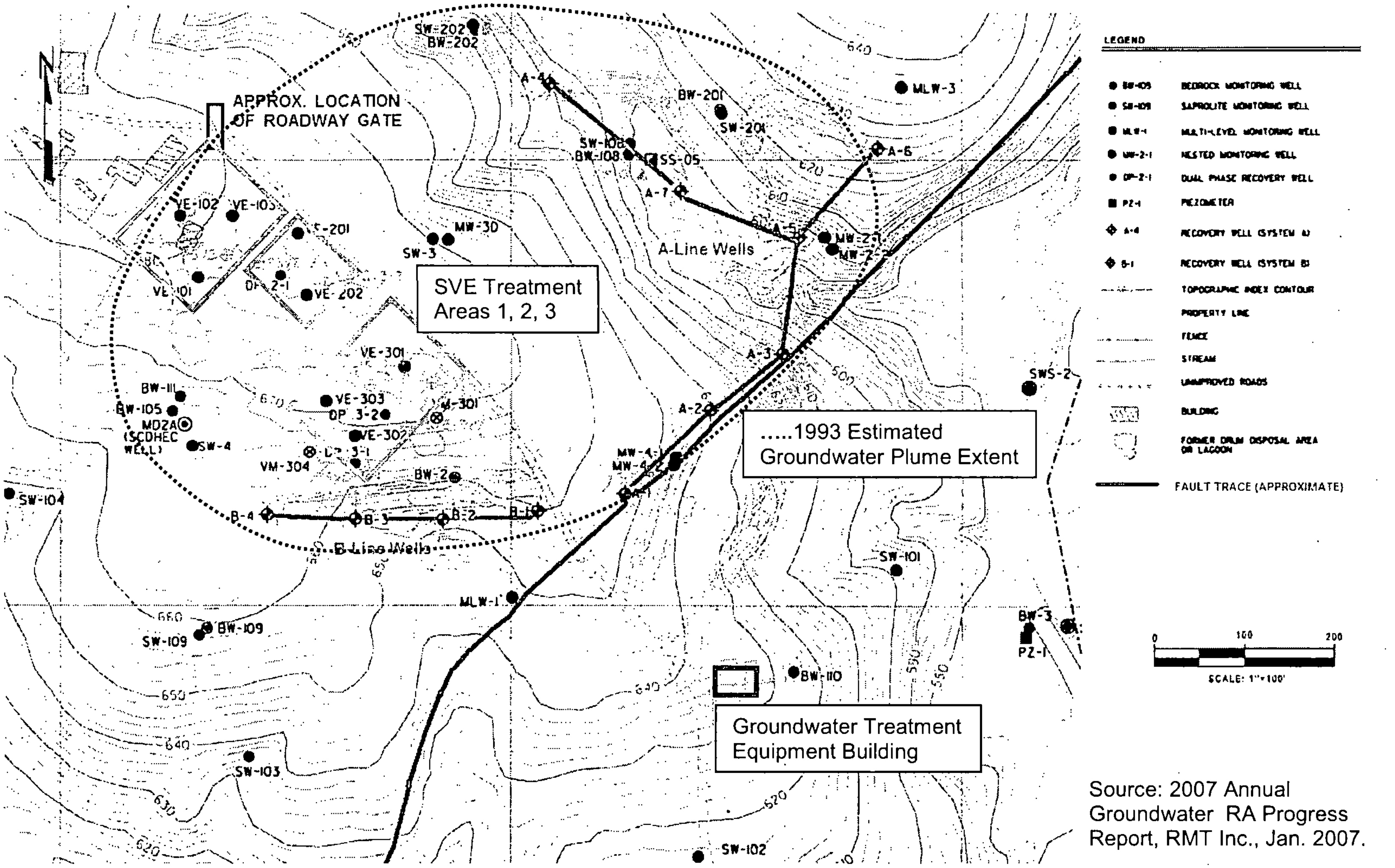
Source: *Underground Injection Control (UIC) Permit Application*, TRC Environmental Corporation, July 2011.

Figure 2 – Site Conditions June 1983



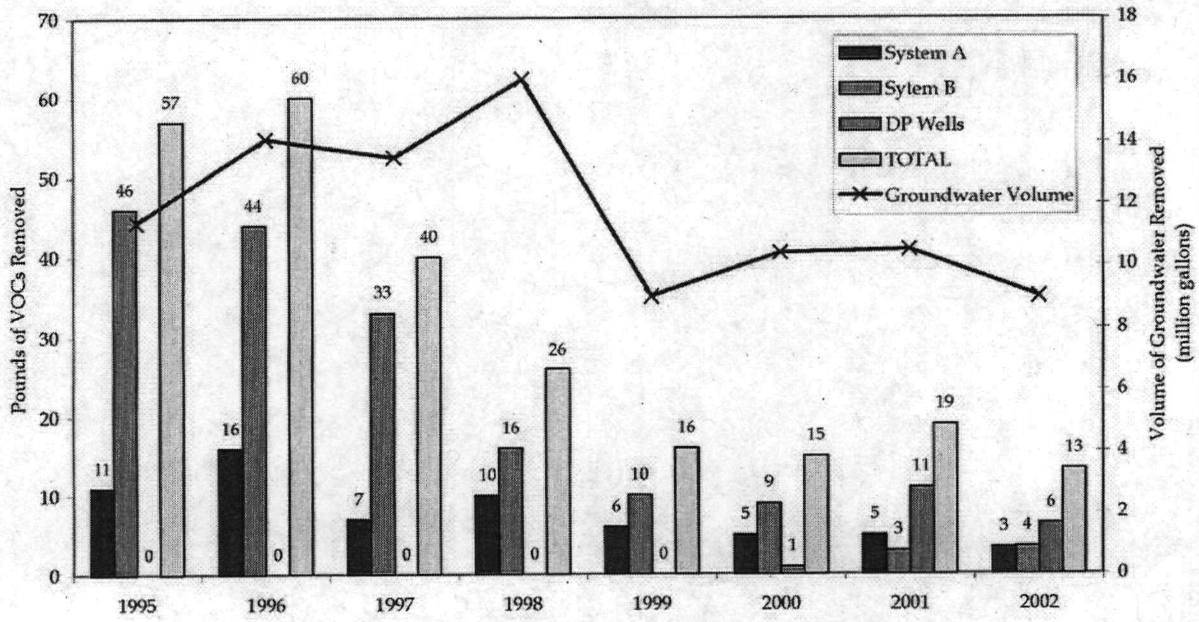
Flyover photograph by US EPA Contractor prior to 1983 Removal Action.
US EPA Region 4 Records.

Figure 3 - Layout of Groundwater and SVE Systems (1993 Remedial Design)



Source: 2007 Annual Groundwater RA Progress Report, RMT Inc., Jan. 2007.

Figure 4 - Historical Mass of COCs Removed from Groundwater 1995-2002



Pounds of Site COCs Removed from Goundwater by Year

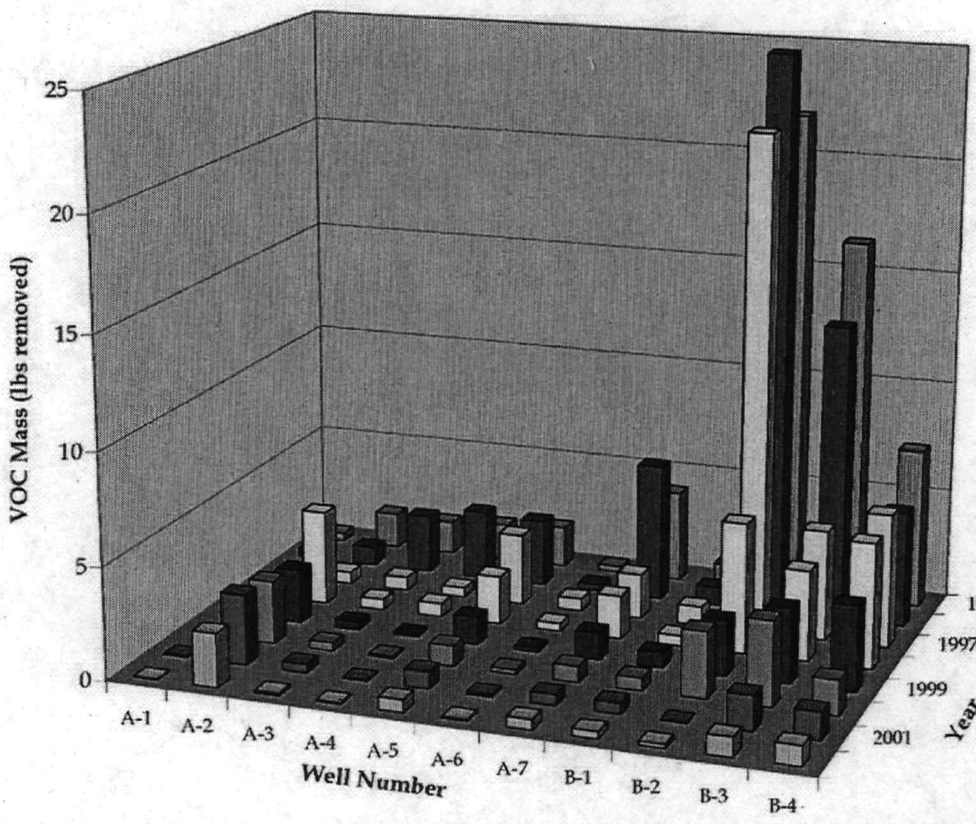
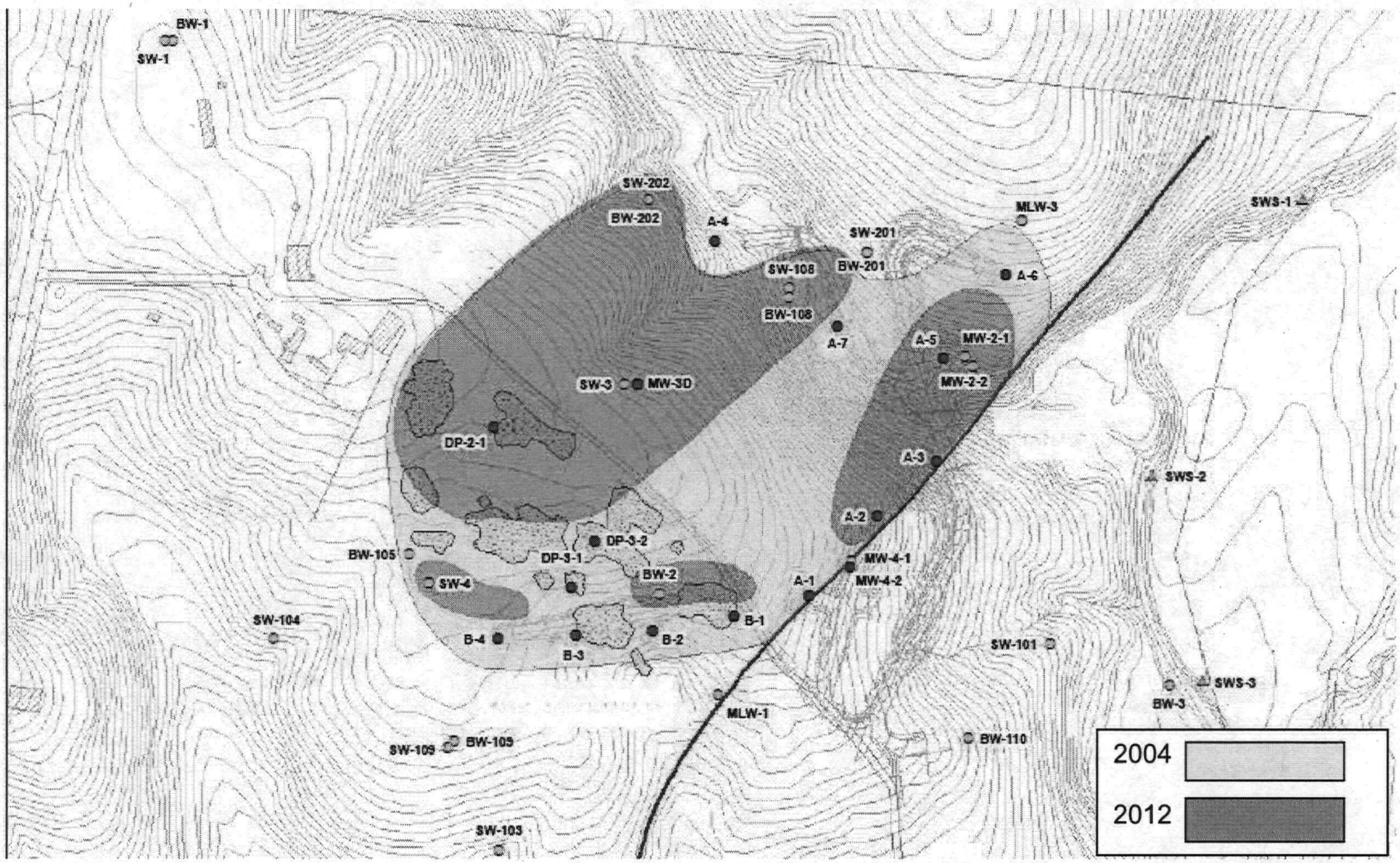


Figure 5 - Remaining Groundwater Contamination Extent, 2012



Source: Focused Feasibility Study, TRC Environmental Corporation, December 2011.

TABLES

Table 1 – Site Groundwater Cleanup Goals			
Compound	Maximum 2010 Detection (µg/L)*	Cleanup Goal (µg/L)**	Source
Acetone	68.7 J	350	BRA[1]
Benzene	3.4 J	5	MCL[2]
2-Butanone	12.9 J	2000	BRA[3]
Chloromethane	ND	63	BRA
Chloroform	9.9	70	MCL[4]
1,1-Dichloroethane	3.2	350	BRA[5]
1,2-Dichloroethane	142	5	MCL
1,1-Dichloroethene	16.3	7	MCL
1,2-Dichloroethene (cis-, trans-)	cis 264; trans 17	cis:70, trans: 100	MCL/MCL
Methylene Chloride (dichloromethane)	ND	5	MCL[6]
Tetrachloroethene	363	5	MCL
1,1,1-Trichloroethane	ND	200	MCL
1,1,2-Trichloroethane	8.4	5	MCL[7]
Trichloroethene	194	5	MCL

Units: Micrograms per liter (µg/L), equivalent to parts per billion (ppb).
(*) "Maximum Detection" samples collected March 2010, presented in Table 1-5 of the Focused Feasibility Study (2011).
(**) Source: 1991 ROD Table 19.

Notes

ND Constituent was not detected.
J The constituent was detected; reported value is an estimate.
1. BRA = Derived in the Baseline Risk Assessment, as cited in 1991 ROD.
2. MCLs: Maximum Contaminant Levels, Safe Drinking Water Act, 40 CFR Parts 141-143, SCDHEC R.61-58.5(N)(2) for Volatile Synthetic Organic Chemicals (VOCs) and SCDHEC R.61-58.5(P)(2) for Total Trihalomethanes, including chloroform (see Note 4).
3. Derived in BRA; goal represents a one in one-hundred-thousand (1×10^{-5}) excess cancer risk level.
4. Chloroform is a trihalomethane. An MCL of 80 µg/L is assigned to the trihalomethane group; however the SDWA also assigns a specific MCL of 70 µg/L to chloroform alone.
5. Derived in BRA; cleanup goal has a 10-fold safety factor included.
6. This MCL was a "Proposed MCL" at the time of the ROD and was later finalized.
7. This MCL was a "Proposed MCL" at the time of the ROD and was later finalized.

Table 2 – Chemical-Specific ARARs, Medley Farm Drum Dump Site			
Action/Media	**Requirements**	**Prerequisite**	**Citation(s)**
Classification of groundwater	All South Carolina groundwater is classified Class GB under SCDHEC R. 61-68H.9, which meets the definition of underground sources of drinking water.	Groundwater, except within mixing zones, within the state of South Carolina – **applicable**	SCDHEC Reg. 61-68H.2
Restoration of groundwater as a potential drinking water source	May not exceed Maximum Contaminant levels (MCLs) for Volatile Synthetic Organic Chemicals (VOCs) as set forth in R.61-58.5(N)(2), and R.61-58.5(P)(2), trihalomethanes (chloroform) [See Table 1 in AROD for list of COCs and cleanup standards.]	Groundwater classified as Class GB under SCDHEC Reg. 61-68H.9 requiring restoration - **relevant and appropriate**	SCDHEC Reg. 61-68H.9.b 40 CFR Part 141 Subpart G (*National Primary Drinking Water Regulations)*
	Shall not exceed concentrations or amounts such as to interfere with use, actual or intended, as determined by SCDHEC.	Presence of waste, pesticides, other synthetic organic compounds, deleterious substances, or constituents thereof not specified in SCDHEC R. 61-68H.9a or b. in Class GB groundwater – **relevant and appropriate**	SCDHEC R. 61-68H.9.c

Table 2 – Chemical-Specific ARARs, Medley Farm Drum Dump Site			
Action/Media	**Requirements**	**Prerequisite**	**Citation(s)**
Protection of Surface Water	Any discharge into waters of the State must be permitted by the Department and receive a degree of treatment and/or control which shall produce an effluent which is consistent with the Act, the Clean Water Act (P.L. 92-500, 95-217, 97-117, 100-4), this regulation, and related regulations. *Note: Discharge of treated groundwater to Jones Creek via NPDES Permit No. SC0046469 may continue on an occasional basis.*	Discharge of pollutants (including toxic substances) into waters of the State of South Carolina – **relevant and appropriate**	SCDHEC R. 61-68E.4.a
	Treated wastes, toxic wastes, deleterious substances in sufficient amounts to make the waters unsafe or unsuitable for primary contact recreation or to impair the waters for any other best usage are not allowed	Waters of the State of South Carolina (classified as SA as provided in SCDHEC R. 61-68G.12) – **relevant and appropriate**	SCDHEC R. 61-68G.12.b

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
General Construction Standards — All Land-disturbing Activities (i.e., excavation, clearing, grading, etc.)			
Managing storm water runoff from land-disturbing activities	Must comply with the substantive requirements for stormwater management and sediment control of *NPDES General Permit No. SCR100000* .	Large and small construction activities (as defined in R. 61-9) of more than 1 acre of land – **applicable**	SCDHEC R. 61-9.122.41 and 122.28 NPDES General Permit No. SCR100000
	The stormwater management and sediment control plan shall contain at a minimum the information provided in the following subsections:	Activities involving more than two (2) acres and less than five (5) acres of actual land disturbance which are not part of a larger common plan of development or sale – **applicable**	SCDHEC R. 72-307I – *South Carolina Storm Water Management and Sediment Reduction Regulations*
	A plan for temporary and permanent vegetative and structural erosion and sediment control measures which specify the erosion and sediment control measures to be used during all phases of the land disturbing activity and a description of their proposed operation;		SCDHEC R. 72-307I(3)(d)
	Provisions for stormwater runoff control during the land disturbing activity and during the life of the facility meeting the following requirements of subsections (e)1 and 2.		SCDHEC R. 72-307I(3)(e)

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
Managing fugitive dust emissions from land disturbing activities	Emissions of fugitive particulate matter shall be controlled in such a manner and to the degree that it does not create an undesirable level of air pollution. Volatile organic compounds shall not be used for dust control purposes. Oil treatment is also prohibited.	Activities that will generate fugitive particulate matter (Statewide) –**applicable**	SCDHEC R. 61-62.6 Section III(a)- *Control of Fugitive Particulate Matter Statewide* SCDHEC R. 61-62.6 Section III(d)
Monitoring Well Installation, Operation, and Abandonment			
Installation or Abandonment of Permanent and Temporary Monitoring Wells	All monitoring wells shall be drilled, constructed, maintained, operated, and/or abandoned to ensure that underground sources of drinking water are not contaminated.	Construction of permanent and temporary monitoring wells (including non-standard installation, as defined in R. 61-71B(2) – **applicable**	SCDHEC R. 61-71H.1(b)
	Abandonment of permanent conventionally installed monitoring wells shall be by forced injection of grout or pouring through a tremie pipe starting at the bottom of the well and proceeding to the surface in one continuous operation. The well shall be filled with either with neat cement, bentonite-cement, or 20% high solids sodium bentonite grout, from the bottom of the well to the land surface.		SCDHEC R. 61-71H.2(e)
Underground Injection Well Installation, Operation, and Abandonment			
Reinjection of treated contaminated groundwater, or	No owner or operator shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection	Underground injection into an underground source of drinking water –**applicable**.	40 CFR 144.12(a)

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
injection of bioamendments, surfactants, or reagents	activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 *CFR* Part 142 or may otherwise adversely affect the health of persons.		
	The movement of fluids containing wastes or contaminants into underground sources of drinking water as a result of injection is prohibited if the presence of the waste or contaminant: ∘ May cause a violation of any drinking water standard under R61-58.5; or, ∘ May otherwise adversely affect the health of persons.	Operation of well for underground injection of any fluids into the subsurface or groundwaters of the State of South Carolina – **applicable**.	SCDHEC R.61-87.5(A) and (B)
	Wells are not prohibited if injection is approved by EPA or a State pursuant to provisions for cleanup of releases under CERCLA or RCRA.	Class IV wells [as defined in 40 CFR 144.6(d)] used to re-inject treated contaminated groundwater into the same formation from which it was drawn –**applicable**.	40 CFR 144.13(c) RCRA § 3020(b)
	No person shall construct, use or operate a Class IV well for injection: Except owners or operators of	Class IV injection wells [as defined in R.61-87.11(D)(1)]for disposing of	SCDHEC R.61-87.11(D)(2)

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
	contaminated groundwater remedial systems treating groundwater to be injected into the same formation from which it was drawn are authorized by rule for the life of the well if subsurface emplacement of fluids is approved by EPA, or the Department, pursuant to provisions for cleanup of releases under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. 9601-9675, or pursuant to requirements and provisions under the Resource and Conservation Act (RCRA), 42 U.S.C. 6901-6992k; In violation of R61-87.5.	hazardous waste into the subsurface or groundwater – **applicable**.	
Plugging and abandonment of Class IV injection wells	Prior to abandonment any Class IV well, the owner or operator shall plug or otherwise close the well in a manner as acceptable to EPA and *as provided in the EPA-approved remedial design document.*	Class IV wells [as defined in 40 *CFR* § 144.6(d)] used to reinject treated contaminated groundwater into the same formation from which it was drawn –**applicable**.	40 CFR 144.23(b)(1)
	Prior to abandoning the well, the owner or operator shall close the well in accordance with 40 CFR 144.23(b).	Operation of a Class IV injection well [as defined in 40 CFR 144.6(d)] –**applicable**.	40 CFR 146.10(b)

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
Plugging and abandonment of Class IV.(2)(a) underground injection wells	Minimum standards for construction and abandonment of injection wells are as those stated for all wells in the SC Well Standards and Regulations (R.61-71).	Operation of well for underground injection of any fluids into the subsurface or groundwaters of the State of South Carolina – **applicable**.	SCDHEC R.61-87.3
Monitoring of Class IV.(2)(a) underground injection wells	An appropriate number of monitoring wells shall be completed into the injection zone and into any underground sources of drinking water (USDWs) which could be affected by the injection operation. These wells shall be located in such a fashion as to detect any excursion of injection fluids, process by-products, or formation fluids outside the injection area or zone. If the operation may be affected by subsidence or catastrophic collapse the monitoring wells shall be located so that they will not be physically affected.	Operation of well for underground injection of any fluids into the subsurface or groundwaters of the State of South Carolina – **applicable**.	SCDHEC R.61-87.14(G)(1)
Injection of bio-amendments, surfactants, or reagents	An injection activity cannot allow the movement of fluid containing any contaminant into USDWs, if the presence of that contaminant may cause a violation of the primary drinking water standards under 40 CFR part 141, other health based standards, or may otherwise	Class V wells[1] [as defined in 40 CFR 144.6(e)] used to inject bio-amendments, surfactants, or reagents – **applicable**.	40 CFR 144.82(a)(1)

[1] *Class V.* Injection wells not included in Class I, II, III, IV or VI. Typically, Class V wells are shallow wells used to place a variety of fluids directly below the land surface. However, if the fluids placed in the ground qualify as a hazardous waste under the Resource Conservation and Recovery Act (RCRA), the well is then considered either a Class I or Class IV well, not a Class V well. Examples of Class V wells are described in 40 CFR § 144.81.

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
	adversely affect the health of persons. This prohibition applies to well construction, operation, maintenance, conversion, plugging, closure, or any other injection activity.		
	Wells must be closed in a manner that complies with the above prohibition of fluid movement. Also, any soil, gravel, sludge, liquids, or other materials removed from or adjacent to the well must be disposed or otherwise managed in accordance with substantive applicable Federal, State, and local regulations and requirements.		40 CFR 144.82(b)
	No person shall construct, use or operate a Class V.A well for injection: Except as authorized by permit as provided by R.61-87.13; in violation of R.61-87.5	Class V.A injection wells [as defined in R.61-87.11(E)(1)(g) and (i)] for injection wells used in experimental technologies or corrective action wells used to inject groundwater associated with aquifer remediation –**applicable**.	SCDHEC R.61-87.11(E)(2)
Operation and maintenance of Class IV(2)(a) and Class V.A Injection Wells	Shall at all times properly operate and maintain all facilities and systems of treatment and controls which are installed or used.	Operation of Class IV(2)(a) and Class V.A. Injection Wells – **applicable.**	SCDHEC R.61-87.13(X)
	Shall report malfunction of injection system which may cause fluid migration		SCDHEC R.61-

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
	into or between underground sources of drinking water; shall immediately stop injection upon determination that the injection system has malfunctioned and could cause fluid migration into or between underground sources of drinking water; shall not restart the injection system until the malfunction has been corrected.		87.13(EE)
Waste Characterization and Storage —primary and secondary waste (e.g., contaminated soil cuttings from well installation, monitoring well purge water, treatment residuals)			
Characterization of solid waste	Must determine if solid waste is a hazardous waste using the following method: Should first determine if waste is excluded from regulation under 40 CFR 261.4; and	Generation of solid waste as defined in 40 CFR 261.2 – **applicable**	40 CFR 262.11(a) SCDHEC R. 61-79 262.11*(a)*
	Must determine if waste is listed as hazardous waste under 40 CFR Part 261.	Generation of solid waste which is not excluded under 40 CFR 261.4(a) –**applicable**	40 CFR 262.11(b) SCDHEC R. 61-79 262.11*(b)*
	Must determine whether the waste is (characteristic waste) identified in subpart C of 40 CFR Part 261by either: (1) Testing the waste according to the methods set forth in subpart C of 40 CFR part 261, or according to an equivalent method approved by the Administrator under 40 CFR 260.21; or	Generation of solid waste which is not excluded under 40 CFR 261.4(a) –**applicable**	40 CFR 262.11(c) SCDHEC R. 61-79 262.11*(c)*

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
	(2) Applying knowledge of the hazard characteristic of the waste in light of the materials or the processes used.		
	Must refer to Parts 261, 262, 264, 265, 266, 268, and 273 of Chapter 40 for possible exclusions or restrictions pertaining to management of the specific waste.	Generation of solid waste which is determined to be hazardous waste –**applicable**	40 CFR 262.11(d) SCDHEC R. 61-79 262.11*(d)*
Determinations for management of hazardous waste	Must determine each EPA Hazardous Waste Number (waste code) applicable to the waste in order to determine the applicable treatment standards under 40 CFR 268 *et seq.*. *Note:* This determination may be made concurrently with the hazardous waste determination required in Sec. 262.11 of this chapter.	Generation of hazardous waste for storage, treatment or disposal – **applicable**	40 CFR 268.9(a) SCDHEC R. 61-79 268.9*(a)*
	Must determine the underlying hazardous constituents [as defined in 40 CFR 268.2(i)] in the characteristic waste.	Generation of RCRA characteristic hazardous waste (and is not D001 non-wastewaters treated by CMBST, RORGS, or POLYM of Section 268.42 Table 1) for storage, treatment or disposal – **applicable**	40 CFR 268.9(a) SCDHEC R. 61-79 268.9*(a)*
	Must determine if the hazardous waste meets the treatment standards in 40 CFR 268.40, 268.45, or 268.49 by testing in accordance with prescribed methods or	Generation of hazardous waste for storage, treatment or disposal – **applicable**	40 CFR 268.7(a) SCDHEC R. 61-79 268.7*(a)* (1)

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
	use of generator knowledge of waste. *Note:* This determination can be made concurrently with the hazardous waste determination required in 40 CFR 262.11.		
Temporary storage of hazardous waste in containers	A generator may accumulate hazardous waste at the facility provided that: ∘ waste is placed in containers that comply with 40 CFR 265.171-173; and ∘ the date upon which accumulation begins is clearly marked and visible for inspection on each container ∘ container is marked with the words "hazardous waste"; or	Accumulation of RCRA hazardous waste on site as defined in 40 CFR 260.10 – **applicable**	40 CFR 262.34(a)(1) and (2) SCDHEC R. 61-79 262.34*(a)* (1) and (2) 40 CFR 264.34(a)(3) SCDHEC R. 61-79 262.34*(a)* (3)
	∘ container may be marked with other words that identify the contents.	Accumulation of 55 gal. or less of RCRA hazardous waste or 1 quart of acutely hazardous waste listed in 261.33(e) at or near any point of generation – **applicable**	40 CFR 262.34(c)(1) SCDHEC R. 61-79 262.34*(c)* (1)
Use and management of hazardous waste in containers	If container holding waste is not in good condition (e.g. severe rusting, structural defects), or if it begins to leak, must transfer waste into container in good condition.	Storage of RCRA hazardous waste in containers – **applicable**	40 CFR 265.171 SCDHEC R. 61-79 265.171
	Must use a container made or lined with materials which will not react with, and are otherwise compatible with, the		40 CFR 265.172 SCDHEC R. 61-79 265.172

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
	hazardous waste to be stored, so that the ability of the container to contain the waste is not impaired.		
	A container holding hazardous waste must always be closed during storage, except when necessary to add or remove waste. A container holding hazardous waste must not be opened, handled, or stored in a manner which may rupture the container or cause it to leak.		40 CFR 265.173(a) and (b) SCDHEC R. 61-79 265.173*(a)* and *(b)*
Storage of hazardous waste in container area	Area must have a containment system designed and operated in accordance with 40 CFR 265.175(b).	Storage of RCRA hazardous waste in containers ***with free liquids*** – **applicable**	40 CFR 264.175(a) SCDHEC R. 61-79 264.175*(a)*
	Area must be sloped or otherwise designed and operated to drain liquid from precipitation, or Containers must be elevated or otherwise protected from contact with accumulated liquid.	Storage of RCRA-hazardous waste in containers that ***do not contain free liquids*** (other than F020, F021, F022, F023, F026 and F027) – **applicable**	40 CFR 265.175(c)(1) and (2) SCDHEC R. 61-79 265.175*(c)* (1) and (2)
Closure of RCRA container storage unit	At closure, all hazardous waste and hazardous waste residues must be removed from the containment system. Remaining containers, liners, bases, and soils containing or contaminated with hazardous waste and hazardous waste residues must be decontaminated or	Storage of RCRA hazardous waste in containers in a unit with a containment system – **applicable**	40 CFR 264.178

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
	removed. [Comment: At closure, as throughout the operating period, unless the owner or operator can demonstrate in accordance with 40 CFR 261.3(d) of this chapter that the solid waste removed from the containment system is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of parts 262 through 266 of this chapter].		
Waste treatment and disposal—primary and secondary waste (e.g., contaminated soils, monitoring well purge water, treatment residuals)			
Disposal of solid waste	Shall ultimately dispose of solid waste at facilities and/or sites permitted or registered by the Department for processing or disposal of that waste stream.	Generation of solid waste intended for off-site disposal – **relevant and appropriate**	SCDHEC R. 61-107.5(D)(3)
Disposal of RCRA-hazardous waste in an off-site land-based unit	May be land disposed if it meets the requirements in the table "Treatment Standards for Hazardous Waste" at 40 CFR 268.40 before land disposal.	Land disposal, as defined in 40 CFR 268.2, of restricted RCRA waste – **applicable**	40 CFR 268.40(a) SCDHEC R. 61-79 268.40*(a)*

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
	All underlying hazardous constituents [as defined in 40 CFR 268.2(i)] must meet the Universal Treatment Standards, found in 40 CFR 268.48 Table UTS prior to land disposal.	Land disposal of restricted RCRA characteristic wastes (D001-D043) that are not managed in a wastewater treatment system that is regulated under the CWA, that is CWA equivalent, or that is injected into a Class I nonhazardous injection well – **applicable**	40 CFR 268.40(e) SCDHEC R. 61-79 268.40*(e)*
	Must be treated according to the alternative treatment standards in 40 CFR 268.49(c) <u>or</u> Must be treated according to the UTSs [specified in 40 CFR 268.48 Table UTS] applicable to the listed and/or characteristic waste contaminating the soil prior to land disposal.	Land disposal, as defined in 40 CFR 268.2, of restricted hazardous soils –**applicable**	40 CFR 268.49(b) SCDHEC R. 61-79 268.49*(b)*
	To determine whether a hazardous waste indentified in this section exceeds the applicable treatment standards of 40 CFR 268.40, the initial generator must test a sample of the waste extract or the entire waste, depending on whether the treatment standards are expressed as concentration in the waste extract or waste, or the generator may use knowledge of the waste. If the waste contains constituents	Land disposal of RCRA toxicity characteristic wastes (D004-D011) that are newly identified (i.e., wastes or soil identified by the TCLP but not the Extraction Procedure) – **applicable**	40 CFR 268.34(f) SCDHEC R. 61-79 268.34*(f)*

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
	(including UHCs in the characteristic wastes) in excess of the applicable UTS levels in 40 CFR 268.48, the waste is prohibited from land disposal, and all requirements of part 268 are applicable, except as otherwise specified.		
Discharge of Wastewater from Treatment Unit			
Disposal of RCRA characteristic wastewaters	Are not prohibited, if the wastes are managed in a treatment system which subsequently discharges to waters of the U.S. pursuant to a permit issued under 402 of the CWA (i.e., NPDES permitted) unless the wastes are subject to a specified method of treatment other than DEACT in 40 CFR 268.40, or are D003 reactive cyanide. ***Discharge of treated groundwater to Jones Creek via NPDES Permit No. SC0046469 may continue on an occasional basis.***	Land disposal of hazardous wastewaters that are hazardous only because they exhibit a hazardous characteristic and are not otherwise prohibited under 40 CFR Part 268 – **applicable**.	40 CFR 268.1(c)(4)(i)
	Are not prohibited, if the wastes are treated for purposes of the pre-treatment requirements of section 307 of the CWA unless the wastes are subject to a specified method of treatment other than DEACT in 40 CFR 268.40, or are D003 reactive cyanide.		40 CFR 268.1(c)(4)(ii)
Transport and conveyance of collected RCRA	Any dedicated tank systems, conveyance systems, and ancillary equipment used to treat, store or convey wastewater to an	On-site wastewater treatment unit [as defined in 40 CFR 260.10] subject to regulation	40 CFR 264.1(g)(6)

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
wastewater to WWTU located on the facility	on-site NPDES-permitted wastewater treatment unit (WWTU) are exempt from the requirements of RCRA Subtitle C standards.	under §402 or §307(b) of the CWA (i.e., NPDES permitted) that manages hazardous wastewaters – **applicable**	
General duty to mitigate for discharge of WWTU	Take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of effluent standards which has a reasonable likelihood of adversely affecting human health or the environment.	Discharge of pollutants to surface waters – **applicable**	40 CFR § 122.41(d) SCDHEC R.61-9 §122.41(d)
	Properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used to achieve compliance with the effluent standards. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures.	Discharge of pollutants to surface waters – **applicable**	SCDHEC R.61-9 §122.41(e)(1)
Technology-based treatment requirements for wastewater discharge	To the extent that EPA promulgated effluent limitations are inapplicable, State shall develop on a case-by-case basis under § 402(a)(1)(B) of the CWA, technology based effluent limitations by applying the factors listed in 40 CFR § 125.3(d) and shall consider: the appropriate technology for this category or class of point sources; and any unique factors relating to the discharger.	Discharge of pollutants to surface waters from other than a POTW – **applicable**	40 CFR § 125.3(c)(2) SCDHEC R.61-9 §125.3(c)(2)

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
Water quality based-effluent limits for wastewater discharge	Must develop water quality-based effluent limits that ensure that: • The level of water quality to be achieved by limits on point sources(s) established under this paragraph is derived from, and complies with all applicable water quality standards; and ○ Effluent limits developed to protect narrative or numeric water quality criteria are consistent with the assumptions and any available waste load allocation for the discharge prepared by the State and approved by EPA pursuant to 40 CFR § 130.7.	Discharge of pollutants to surface waters that causes, or has reasonable potential to cause, or contributes to an instream excursion above a narrative or numeric criteria within a State water quality standard established under §303 of the CWA – **applicable**	40 CFR § 122.44(d)(1)(vii) SCDHEC R.61-9 § 122.44(d)(1)(vii)
Monitoring requirements for discharges from WWTU	In addition to §122.48 and to assure compliance with effluent limitations, one must monitor, as provided in subsections (i) thru (iv) of §122.44(i)(1). *Note: Monitoring parameters, including frequency of sampling, will be developed as part of the CERCLA process and included in a Remedial Design, Remedial Action Work Plan, or other appropriate CERCLA document.*	Discharge of pollutants to surface waters – **applicable**	40 CFR §122.44(i)(1) SCDHEC R.61-9 §122.44(i)(1)

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
	All effluent limitations, standards and prohibitions shall be established for each outfall or discharge point, except as provided under §122.44(k)		40 CFR §122.45(a) SCDHEC R.61-9 §122.45(a)
	Transportation of Wastes		
Transportation of hazardous waste *on-site*	The generator manifesting requirements of 40 CFR 262.20 through 262.32(b) do not apply. Generator or transporter must comply with the requirements set forth in 40 CFR 263.30 and 263.31 in the event of a discharge of hazardous waste on a private or public right-of-way.	Transportation of hazardous wastes on a public or private right-of-way within or along the border of contiguous property under the control of the same person, even if such contiguous property is divided by a public or private right-of-way – **applicable**	40 CFR 262.20(f) SCDHEC R. 61-79 262.20*(f)*
Transportation of hazardous waste *off-site*	Must comply with the generator requirements of 40 CFR 262.2023 for manifesting, Sect. 262.30 for packaging, Sect. 262.31 for labeling, Sect. 262.32 for marking, Sect. 262.33 for placarding, Sect. 262.40, 262.41(a) for record keeping requirements, and Sect. 262.12 to obtain EPA ID number.	Generator who initiates the off-site shipment of RCRA-hazardous waste – **applicable**	40 CFR 262.10(h) SCDHEC R. 61-79 262.10*(h)*

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
Transportation of hazardous materials	Shall be subject to and must comply with all applicable provisions of the HMTA and DOT HMR at 49 CFR 171-180.	Any person who, under contract with a department or agency of the federal government, transports "in commerce," or causes to be transported or shipped, a hazardous material – **applicable**	49 CFR 171.1(c)
Transportation of samples (i.e. solid waste, soils and wastewaters)	Are not subject to any requirements of 40 CFR Parts 261 through 268 or 270 when: ∘ the sample is being transported to a laboratory for the purpose of testing; or ∘ the sample is being transported back to the sample collector after testing. ∘ the sample is being stored by sample collector before transport to a lab for testing.	Samples of solid waste or a sample of water, soil for purpose of conducting testing to determine its characteristics or composition – **applicable**	40 CFR 261.4(d)(1)(i)-(iii) SCDHEC R. 61-79 261.4*(d)* (1)

Table 3 – Action-Specific ARARs/TBCs, Medley Farm Drum Dump Site			
Action	**Requirements**	**Prerequisite**	**Citation**
	In order to qualify for the exemption in 40 CFR 261.4 (d)(1)(i) and (ii), a sample collector shipping samples to a laboratory must: ∘ Comply with U.S. DOT, U.S. Postal Service, or any other applicable shipping requirements. ∘ Assure that the information provided in (1) thru (5) of this section accompanies the sample. ∘ Package the sample so that it does not leak, spill, or vaporize from its packaging.		40 CFR 261.4(d)(2) 40 CFR 261.4(d)(2) (ii)(A) and (B) SCDHEC R. 61-79 261.4*(d)* (2)(ii)(A) and (B)

Table 4 – Detailed Cost Estimate, Selected Remedy (ERD)

DESCRIPTION	QUANTITY	UNIT	COST ($)	TOTAL	COMMENTS
Quarterly Inspection					
Staff Technical	16	MH	131.00	2,096.00	
Field Technician	32	MH	78.00	2,496.00	One day per quarter
Travel Allowance	4	EA	110.00	440.00	Gas, Truck, Meals
Maintain Institutional Controls					
Staff Technical	20	MH	131.00	2,620.00	Site Maintenance and Institutional Controls
Allowance	1	Allow	1,100.00	1,100.00	Institutional Controls
Measure Water Levels, Generate Map					Water level elevation map
Staff Technical	40	MH	131.00	5,240.00	
Field Technician	40	MH	78.00	3,120.00	Two technicians for two days
Travel Allowance	3	Ea	110.00	330.00	Gas, Truck, Meals
Project Management					
Project Manager	120	MH	190.00	22,800.00	
Administrative Assistant	24	MH	60.00	1,440.00	
Mowing	4	EA	1,100.00	4,400.00	One event per quarter
Annual GW/SW Sampling					
Staff Technical	20	MH	131.00	2,620.00	
Field Technician	200	MH	78.00	15,600.00	Two technicians for 10 days
Lab Analyses	59	EA	110.00	6,490.00	59 samples
Misc Sampling Expenses	1	EA	1,100.00	1,100.00	Ice, shipping, coolers, materials, etc.
Travel Allowance	20	EA	110.00	2,200.00	Gas, Truck, Meals, etc.
Expand ERD Injection System		Allow	150,000.00	150,000.00	**Applies to First Year Only**
Conduct ERO Injections					
Annual Injection Event	1	LS	80,000.00	80,000.00	
Maintenance of ERD Equipment	1	LS	5,000.00	5,000.00	
Meet/Respond - SC DHEC and USEPA	1	Allow	20,000.00	20,000.00	
Annual Reporting to USEPA	1	Allow	25,000.00	25,000.00	
20% Contingency	1	Allow	40,818.40	70,818.40	
TOTAL ANNUAL COSTS				**$244,910.40**	
(Note: The one-time capital cost for system expansion ($150,000) above applies to Year 1. Years 5 and 10 will have an additional $25,000					

cost for the FYR. Finally, years 6 through 10 will not include the $85,000 annual cost shown above to perform the ERD treatments.

Table 5 – Detailed Cost Estimate, Contingency Remedy (MNA)

DESCRIPTION	QUANTITY	UNIT	COST ($)	TOTAL	COMMENTS
Quarterly Inspection					
Staff Technical	16	MH	131.00	2,096.00	
Field Technician	32	MH	78.00	2,496.00	One day per quarter
Travel Allowance	4	EA	110.00	440.00	Gas, Truck, Meals
Maintain Institutional Controls					
Staff Technical	20	MH	131.00	2,620.00	Site Maintenance and Institutional Controls
Allowance	1	Allow	1,100.00	1,100.00	Institutional Controls
Measure Water Levels, Generate Map					Water level elevation map
Staff Technical	40	MH	131.00	5,240.00	
Field Technician	40	MH	78.00	3,120.00	Two technicians for two days
Travel Allowance	4	Ea	110.00	440.00	Gas, Truck, Meals
Project Management					
Project Manager	60	MH	190.00	11,400.00	
Administrative Assistant	12	MH	60.00	720.00	
Mowing	4	EA	1,100.00	4,400.00	One event per quarter
Annual GW/SW Sampling					
Staff Technical	20	MH	131.00	2,620.00	
Field Technician	200	MH	78.00	15,600.00	Two technicians for 10 days
Lab Analyses	59	EA	110.00	6,490.00	59 samples
Misc Sampling Expenses	1	EA	1,100.00	1,100.00	Ice, shipping, coolers, materials, etc.
Travel Allowance	20	EA	110.00	2,200.00	Gas, Truck, Meals, etc.
Meet/Respond - SC DHEC and USEPA	1	Allow	11,000.00	11,000.00	
Annual Reporting to USEPA	1	Allow	20,000.00	20,000.00	
20% Contingency	1	Allow	18,616.40	18,616.40	
TOTAL ANNUAL COSTS				**$111,698.40**	

(Note: Years 5 10, 15, 20, 25, and 30 will have an additional $25,000 cost for the FYR, which is not included here in the total annual costs.

APPENDIX A
State Concurrence Letter

D H E C

PROMOTE PROTECT PROSPER

Catherine B. Templeton, Director

Promoting and protecting the health of the public and the environment

May 18, 2012

Franklin E. Hill, Director
Superfund Division
US EPA, Region IV
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303

Re: Medley Farm Drum Dump Site
Cherokee County, South Carolina
Amended Record of Decision

Franklin

Dear Mr. ~~Hill~~:

The Department has reviewed and concurs with all parts of the Amended Record of Decision (ROD) dated May 2012 for the Medley Farm Drum Dump Site in Cherokee County, South Carolina. In concurring with this Amended ROD, the South Carolina Department of Health and Environmental Control (SCDHEC) does not waive any right or authority it may have under federal or state law. SCDHEC reserves any right or authority it may have to require corrective action in accordance with the South Carolina Pollution Control Act. These rights include, but are not limited to, the right to insure that all necessary permits are obtained, all clean-up goals and remedial criteria are met, and to take separate action in the event clean-up goals and remedial criteria are not met. Nothing in the concurrence shall preclude SCDHEC from exercising any additional response actions in the event that: (1)(a) previously unknown or undetected conditions arise at the site or (b) SCDHEC receives information not previously available concerning the premises upon which SCDHEC relied in concurring with the selected alternative; and (2) the implementation of the remedial alternative selected in the Amended ROD is no longer protective of human health or the environment.

The Department supports the use of Enhanced Reductive Dechlorination (ERD), employed as an active treatment process for groundwater, as the Amended Site Remedy. Additionally, the Department also supports the use of Monitored Natural Attenuation (MNA) as a Contingency Remedy to the Amended Site Remedy. MNA would be utilized only if MNA can be demonstrated to meet cleanup levels sooner than ERD could meet them. MNA, if employed, would be implemented by the development of an Explanation of Significant Difference, which would include a public comment period.

If you should have any questions regarding the Department's concurrence with the Amended ROD, please contact Greg Cassidy at (803) 896-4178.

Sincerely,

Daphne G. Neel

Daphne G. Neel, Bureau Chief
Bureau of Land and Waste Management

Cc: Don Siron, BLWM
Ken Taylor, BLWM
Van Keisler, BLWM
Chuck Williams, BLWM
Susan Turner, EQC Region 2
52123, file

APPENDIX B

Transcript of Pubic Meeting, March 20, 2012

EPA PUBLIC MEETING

MEDLEY FARM DRUM DUMP SITE

Meeting, held on March 20, 2012, at the Corinth Baptist Church Gym, 190 Corinth Road, Gaffney, South Carolina, commencing at 7:00 p.m., before Cathy L. Young, Court Reporter and Notary Public in and for the State of South Carolina.

APPEARANCES:

Ralph Howard, EPA, Presenter

Sherryl Carbonaro Lane, EPA

Bill O'Steen, DHEC

Greg Cassidy, DHEC

Chuck Williams, DHEC

Casey Jarman, DHEC

Phillip L. Conner, Esquire

MEETING

EPA PUBLIC MEETING

MARCH 20, 2012

MR. HOWARD: Good evening everybody. I am Ralph Howard. I work for the Environmental Protection Agency in Atlanta, Georgia, the regional office for EPA. Thanks for coming out tonight to hear our presentation about the Medley Farm Drum Dump Superfund Site, which I'll just refer to as the Medley Farm Site during my presentation. Our purpose here tonight is to ask for input concerning our proposed plan for changing the way the site is being cleaned up, and that's our overarching purpose. So I wanted to add right here at the beginning that these slides are -- I tried to stay with the big picture. There are more details about what we're proposing to do, and have done at Medley Farm in this booklet, this proposed plan booklet. Behind this booklet is even more detail in a document that is over at the Gaffney Library, which is called a focused feasibility study, and -- and what that is is a study that looks at possible ways we could have the site cleaned up as well as a comparison of those, better and worse, strengths and weaknesses. So the answer to your questions about detail is -- is probably -- if not here, probably in that focused FS as we call it, FS for feasibility study. There are many details I'm going to skip past. If you have a question that has to do with understanding what I'm saying, please don't wait till the end, please raise your hand, I'd really like to get to that now. If the question is kind of detail oriented and could just wait till the end, I would just ask you to hold those questions. Because it's a lot of technical information, and my fear is, we won't get to the end where the really important stuff is; but, yet, we've got to go through these earlier things to understand how we got where we were. So I -- I think I'll be finished speaking before anyone needs to take a break, but it appears there's restrooms right over here, I believe. So, hopefully, I'll get through, and then we'll take a short break.

But I'd like to take your questions at the end, and feedback particularly. So as it says here on the title, we're proposing to change the 1991 cleanup plan which was documented in a record of decisions. You'll see they're referred to. So we will get through many things this evening, hopefully quickly. I'll introduce some people who -- who have come here with me and worked on the site over the years. I've got one slide to talk about. This is the purpose of the meeting. Then I've got to go through a lot of site background. That site background reaches more than 30 years -- about 30 years. And then there were options for what we could, and I'll get into those options for completing the site cleanup. Those are thumbnail sketches, by the way, is really all. There's more detail out there in the documents I mentioned. Then we'll present to you which one we think is the best, the way to go. Then I'd like to get your feedback on those. So, of course, I'm the project manager for EPA, and my job is to oversee and manage the cleanup activities, which are being done by the private parties, potentially responsible parties that are involved at Medley Farm. And they have done all the work that has been required at the site since they came aboard in 1988. So I'm representing EPA. My community involvement coordinator is Sherryl, who signed you in over here, Sherryl Carbonaro, soon to be Sherryl Lane.

MS. LANE: I'm already Sherryl Lane.

MR. HOWARD: Sherryl Lane, I'm so sorry. Bill O'Steen, here on the front row, is a hydrogeologist at Region Four. Bill has long time involvement on this site and knows it very well. From the State of South Carolina I have three staff persons here from DHEC with me, Greg Cassidy is project manager, Chuck Williams is the hydrogeologist, and I'm drawing a blank on --

MS. JARMAN: Casey Jarman.

MR. HOWARD: -- Casey Jarman, who I worked with on another site, at South Carolina DHEC. She's the project manager, but not on this site. So they're here with us this evening as well. Mr. Phil Connor is here in the back row. Phil is an attorney at McNair Law Firm in Greenville, right?

MR. CONNOR: Right.

MR. HOWARD: And works for and with the responsible parties that are doing the cleanup work. So we also have Mr. Mathis, we're glad you're here with us this evening, sir, who is the City Councilman here in Gaffney. So Superfund, what the heck is that? Superfund is a big environmental law passed by Congress back in 1980. The common name is Superfund, which really just refers to the money source for the program. It actually has all these parts you see named here, response, compensation, and liability; but the -- the -- and it's a complicated law, no doubt about that. But the purpose is fairly simple, which was to go after, and see that the nation's most serious uncontrolled, or abandoned hazardous waste sites get cleaned up, and it does have to be hazardous waste sites, not just any sites.

It was reauthorized and strengthened in 1986 with a set of amendments, and that is really the law we operate under. There's a regulation. Of course, you know for every law there has to be a regulation unfortunately. Ours is called the national contingency plan, and it is the plan by which we operate the program. It tells us what we can and can't do. And, fortunately, for those of us in the program, we're -- we're glad to see that it does have extensive requirements to involve the communities. I mean this is, you know, we'll go back to Atlanta, but you live here. And it should be the case that the community has a say, and the State has a say in the decision making that's got to be done on these sites. Like Medley Farm, they go many years and are very expensive and long-term to cleanup. It -- it would be a shame if we didn't have input into the program. That regulation I mentioned, the NCP, it's -- it's really a framework, a program, and we try to move sites through, get them to the end, get them to cleanup. Naturally, that's got to be done in a step wise manner. If you want to get good results, you execute the program, and make it better as you go. And that means that we have a lot of steps here, unfortunately, but the Medley Farm site is actually way out here, meaning that we have already done a number of things that I don't have much detail here about. But the site was placed on the list, I'll go through some history in a moment, of the nation's sites that are to be addressed under Superfund. It has had, at this stage, RIFS, definitions in a moment, it has had a large study. It has had a decision made on a cleanup plan here. And it has had a design, and a -- a remedial action plan, a cleanup plan, designed and completed for the site. We've built everything we need to, which is construction complete. We're beyond that now. And the next big major milestone for this site is to finish. We are out in the process pretty far. The site was studied way back in 1988 to 1991, and that study is called remedial investigation feasibility study. You see this acronym on the previous slide right here, remedial investigation feasibility studies. The site actually has history before that. If you were in Gaffney in the early 1980s, you remember that there was a lot of local press about what was out on that farm site. There were also some other hazardous waste sites in the area, that were getting a lot of attention from the State, and pretty soon from EPA. This site came to us -- came to EPA's attention through the State, and pretty soon both the State and EPA have had people out here to inspect and see what was out here. Even though I don't have it on my slide, EPA actually conducted a -- a fairly large removal action, which is sort of an immediate cleanup action, bulldozers, large volumes of soil taken offsite. I have -- I do have some more here about what was taken offsite. When the big study was done, the end of that was a record of decision, ROD, and the decision outlined a plan to take care of both contaminated soil and contaminated groundwater; again, more details in a moment. But while we're here tonight is that despite all this work you see outlined on the slide, we -- we are not finished. We have had -- have gained substantial improvement but not yet reached cleanup goals. To make further progress on cleaning up the site, we've got to change the remedy, do something that will take care of the remaining groundwater problem onsite. It's important to note here we don't have a soil problem remaining onsite. This is not a site with a soil problem where you need to worry about walking out there and being at risk. So I think everybody knows where we are, but just in case, it's always nice to have a slide that shows exactly where -- I believe we're like to there, just down Corinth Road. So right back across the road on Burnt Gin Road, if you go down to -- what is it 870 something, down the road on the east side of Burnt Gin Road is where the site is. I think everybody knows. This is where we began.

This is what an aerial flyover photograph showed in 1983. That isn't, by the way, the entire site. As you'll see in a little bit, I'll show you kind of a box I'll do with the cursor to show you how much of the site this is showing. But this actually does show most of the problem onsite, which was the disposal of drums and other containers that had been brought to this -- this former farm and property. It -- it was what we used to call in the '80s and early '90s a backyard drum dump site. Only about seven acres of the site were actually used to dispose of industrial wastes. They came from North and South Carolina mostly. The site, as I mentioned, came through the State of South Carolina. They had done an inspection and found about 2,000 drums in all on the property, some in bad condition. There turned out to be more drums on site actually. When EPA came out in the summer of 1983, our removal action, which, again, is sort of an immediate response to get a really bad site off of a property immediately. If there are private parties that we know of already, EPA will generally have those private parties do the work. We offer them the chance to do the work, and nine times out of ten, they'd rather do the work, it's probably more cost efficient. In this case, we didn't have that. EPA did this removal action itself with our contractors, and wound up removing the numbers you see here, 5,400 drums and containers, 2,100 cubic yards of soil, 70,000 gallons of liquids. You might recall there were watery looking areas on the photograph.

MS. SARRATT: Are those numbers in here?

MR. HOWARD: Yes, ma'am?

MS. SARRATT: Are those numbers on here? Those numbers up there in here?

MR. HOWARD: They are. They sure are. Most all the details are in there, thankfully.

MS. SARRATT: I don't have to write in other words?

MR. HOWARD: Yes. I understand,

it's lot of numbers. There were places, where by design or happenstance, there were liquid, there was water all over the place. Much of that did have contamination in it. All of that was taken offsite. These were taken to either approved landfills, or they were incinerated, in the case of the liquids. We did do some studies in the mid-1980s to consider the site for Superfund. Those were completed by 1985. And then in 1986 EPA did propose to put the Medley Farm site on a list, called the NPL, that is the National Priorities List. And it's a list of those sites that are being addressed by superfund, but EPA has to propose that, there's public comment. There's a number of steps you have to go through. And, quite frankly, the site has to be evaluated and ranked. It has to be bad enough, and EPA uses a numerical scoring system. I won't go too much into that, but most sites are not going to be Superfund sites, and that's -- that's the way it was designed, and that's the way it should be. There are something like 1,600 now, I believe, across the country, though that number sounds high. And I'm not even sure it's 1,600. But there are thousands and thousands that do not come to the Superfund program, because they can be cleaned up elsewhere, and are cleaned up elsewhere. They should not be in the program. This was a site that -- that we felt like needed to go to the National Priorities List, and it took a while, but the site was on the list final in 1989. Then before that, actually, potentially responsible parties that were -- that had their materials at the site were -- signed an order with us to perform work there, and -- and the work to begin with was the work I mentioned earlier, remedial investigation feasibility study. Wound up being more than a three-year study in all. But it's not surprising, it's kind of a big site. Groundwater was the more difficult issue at -- at Medley Farm. A two-phase study is not unusual, plus, you have to remember the feasibility study is looking at -- proposing and looking at what are the possible ways to clean up the site. So this -- this took a lot of work to get this completed, but at the end of the day, we knew there would be a remedy to cleanup soils and a remedy to clean up groundwater. That is what we wound up here. I've used some acronyms, unfortunately. You can't get away from that in this environmental field, I'm afraid. Volatile organic compounds refers to organic chemicals, generally, liquids. And these are chemicals that will evaporate into the air easily if you leave them out. Good examples would be gasoline. They come to a vapor very easily. You smell it. It has an odor. Trichloroethylene, it's used for engine cleaning all the time. It's a common use in the industry. It cleans parts very well. Tri -- Tetrachloroethylene's used for dry cleaning. That's what you smell when you get that sickly sweet smell coming off of the stuff you get from the dry cleaner, and it hasn't aired out yet, that's -- that's tetrachloroethylene, I believe. But that's -- those are kind of common examples of volatile organic compounds that are liquids. That's what we had here that were about like 14 different ones. There were some compounds that were semi-volatile, simply meaning they don't evaporate as easily. They were not really a big problem in site soils, but they were there. Groundwater had the volatile organic compounds. There -- there was a risk presented by the site. Now, the risk applied to a future use where someone attempts to use the groundwater as a resource, drinking water. However you would use it in a residential home, if that was done in the future from water from that site, you would have a risk. But it is important to know that the site was not a risk from the soil. The problem with soil, and the reason that the remedy dealt with soil, is because soil was going to contaminate groundwater. There was good evidence that that was going to happen. As it worked out, when the cleanup was done, that turned -- very much turned out to be the case, much more contamination was able to be removed from soil. But that is why soil was addressed was to prevent groundwater, the contamination from simply seeping down into the groundwater. We did have contaminated groundwater on site, and I'll show you a map in a moment, kind of what that -- where that is, and what it looks like. Our choice for dealing with groundwater was to pump and treat it, meaning that you actually use water wells. Pump the water out of the ground, and then run it through a treatment system. And in our case, the system was called air stripping. It's a little complicated to explain, but -- but think of it as running that water over agitation, which you might do, by -- how can we describe a stack? Anyway you can -- you can do the water in such a way that the volatiles, again, remember those compounds want to go to the air. So if you treat them just right in an air stripper, they will actually be stripped off the water. You wind up with clean water, and you wind up with the VOCs going into the air. Okay, and that was our remedy for groundwater. To do that, of course, you have to build a big system of wells and capture the water. I'll show you that in a moment. Then we had clean water coming off of that treatment. That water, we found, would be able to go to Jones Creek, which is a creek downhill. We'll look at a map in a moment, but the important thing is that requires a permit, and that permit was gained here. To deal with the soil, we chose, at that time, new technology called soil vapor extraction. To do soil vapor extraction, you also use wells, but the wells stop, before you get down in the groundwater. And what you simply do is you vacuum the air through those wells, and you're pulling in vapors. Again, vapors being the big deal here. And you pull those vapors into those wells, run them through a carbon treatment to pull them off, activated carbon charcoal kind of thing. And you can -- you can actually clean them out of the soil that way. And that was what was done here. The goals of the entire remedy being to take away the health risk, the future health risk, and also to return that groundwater resource to its beneficial use as a water source. So this is kind of getting on into the site history. But now we kind of begin to move into cleanup more. These different dates you see here are not -- are not critically important, I guess, but I wanted to present the kind of sequence of events that led -- events, I'm sorry, that led to the cleanup. There were some important -- there were a lot of important activities back in these years, but I would highlight especially some work that was done in the remedial design. When a contractor sets out to do or build systems to do like what I've spoken of, there's quite a design project involved. It becomes a rather large engineering project to do it right. If you don't do it right, your system doesn't do what it's intended to do. And in this case, a great job was done on design, and then implementing that design. There were some big questions in the remedial design that had to be answered. And one of them was why the groundwater had this distinctive pattern or spread that you're going to see in a moment. I probably should have a map up first. But it turned out that there were some very interesting geologic features in play at the Medley Farm site. The design, of course, included a big system of wells, as I mentioned. This wound up having two arms on an 11 well design, deep, large diameter pumping wells. They don't use electric pumps, interestingly. They circulate water in air. This -- this was a good system for -- for this site. We also did wells, as I mentioned, for the soil vapor extraction system. It -- it turned out that by installing the wells in three areas, you could actually reach out, and affect a great area of soil, larger than expected, originally; so we wound up with nine pumping wells and eight monitoring wells connected to what you would expect to do that kind of vacuuming. A big blower type motor, okay? And it's pulling in air at high volumes of

MEETING

cubic feet, and it's running continuously actually. Everything was finished by 1995. And we began actually operating both systems in the fall of 1995, which means that we had crossed the corner into remedial action, and no more construction, no more design, no more study, we're actually onto the actual cleanup itself. Hard to believe that that was 17 years ago come this next December. So I think I've spoken too much about the site without really showing you this first. I apologize for that, but this will -- this -- this slide will catch you up though. This is all 65 or so acres of the original site. Property lines look generally similar to this now, but this black hatched area you see here, encompasses the -- well, mostly encompasses the area used for disposal. And what you saw in that overhead aerial flyby was about like -- was only part of this. What you saw in the aerial flyby was really only from about here at the northwest corner to about here at the southeast corner. The site was much bigger, but that photograph did show you the -- what is now an open field. It was an open field then where the disposal of all the drums, and the liquids, and everything were. Of course, we have an entrance road coming in on the site. Family residents dwelling here. And these roads you see up here did not exist back at the time of the site's use for disposal of all this stuff. Those roads were not there, but the site look generally the same other than a lot of woods clearing has been done down -- down here. Jones Creek that I mentioned is over here to the east, and it is downhill from this area up here which lies along the ridge line. This is a gradually lowering ridge line coming downhill. That's what the site property looks like from above. I mentioned earlier that at the time we started -- I'm sorry, before we started remedial action, we had to figure out in the design what was going on with the groundwater. Why should it be that if this is the creek down here, and your lines -- you take all the wells we have onsite, and you look at the level of water in those wells, when you -- when you do that, if this creek is in the downhill direction all over the place, then why isn't the groundwater going directly down here? Now, that was something of a mystery. And it needed to be figured out, because the creek remained clean with non-detects and has so for the duration of the project. So there had to be something going on geologically to explain this elongation of the plume out to the northeast, why was it doing that? It was not the downhill expected direction of groundwater flow. In order to resolve this, the contractor for the PRPs knew that he was going to be building a large pump and treat system anyway, and to do that requires a lot of bore holes to be drilled into the rock. So why don't we use the necessary drilling to figure out what is going on with the top of the rock, and how far down does the rock become fractured, how far down before the rock is really unweathered, okay, it's acting as a bottom? You know, where are those two things at the very least? So what you see on these red diamonds, each of those is a place where a deep boring was conducted for a well. And looking at it now, actually, every one of those might not have been used for a well. I'm looking down here on the -- this lower south line. But in any case, each of the red diamonds shows where that boring and drilling was done, including a smaller number on this side over here. And what was found is -- is indicated best by this solid line you see extending from the northeast to the southwest. What these black lines are showing you is the top of bedrock. And if you read the numbers on each of these lines, you'll see that we're sloping downhill this way to the east, and here we are increasing in elevation as we go this way to the west. And that line actually represents a fault, a geologic fault that cuts the site in half. And you don't see that every day on a hazardous waste site. But it's present here in the mapping of the rock surface, and these boreholes showed it clear as day. To be sure, there can be some uncertainty about the shapes you see diagramed here, and the amount of slope that you see diagramed here, by these lines; but you -- you cannot explain this type of bedrock shape in any other way. But in order to really nail it, they did a lot of onsite geologic work. And what they were looking for was other faults, other expressions of the fault, just meaning a place, where I could see it. And they actually drilled ditches, trenches across where they believed the fault to be. I don't believe they're on this map, but one was in the vicinity of this, one was in the vicinity downhill over here. And there were, in fact, several places where they could map a fault. And what they found is, that the fault is this line that you see, you have to think of it as dipping down into the ground coming this way, coming towards this like that. So you have a high block here and a low block over here. And if I -- if I have the -- if I make that, and show you what that looks like, it's going to put a high side over here, and a low side here. It's going to serve to this higher groundwater -- I'm sorry, this higher bedrock is going to serve the block and move water this way. And it would ordinarily go that way. But it's -- it's a structure, and it's in the ground. And, in fact, we found -- I'm sorry, the people who did the actual field work and sweated a lot more than me out there found that there were traces in the rock itself of fractures and so forth oriented the same way as the fault. All of which serve to help the groundwater move to the northeast and hinder it from moving to the southeast. Certainly, it's not as simple as that, and certainly there's more than one flow tendency out there, we -- we know that. But it does offer an explanation, a well -- well-proven explanation for why the groundwater behaves the way it does. And for purposes of building a site cleanup system for groundwater, it was crucial information. Because as you might notice here, each of these wells, which is what you see connected by the lines, could have been placed on the wrong side of the fault, which would have been a disaster, a boondoggle, a huge waste of money. It would -- I can't even think about how bad it would have been. The wells would have always produced clean water, and we never would have believed that. And some really major mistakes were avoided because of all this onsite work. So in response to what they found, there were substantial changes, and additional wells, and capacity to move water wound up in this area, and out this way. So we have a two-arm system. Water is being captured, you see my cursor here along this southern line called the B line; and water is being captured along this A system, in the northeast area, called the A line wells. And the blue represents the fault on this -- on this figure. That proved to be important. The system was built, and as I mentioned by late 1995, we were in operation. There were things that happened during the next few years that added to the system, including success with the soil vapor extraction, that led to the idea of just let's pump all the wells we have sitting out there, let's just pump them all. So wells we used to use to monitor now we just hook them up, and vacuum them also. So now you have 17 wells pumping. Probably did speed up things. In 2000 there was evidence I won't get into, but certainly evidence that if we went to a certain part of the site, we should -- we could consider dual phase wells that would better bring out more contamination. Was not an area that were really wells in there to -- to prove it or test it with, but after the wells went in, and those were added to the SVE and groundwater systems, there was more cleanup accomplished in that one area that we call area three; one of the three soils areas I mentioned. By 2004, in fact, the -- the cleanup goals for soil had been met, and this was done through testing. One of the plans you make back then in design is how will we know we have accomplished what we need to do? So they met the goals at that time of the plan that had been set up in the remedial design. At this time also, in 2004, we approved turning off or shutting down the pump and treat system, and did likewise for the SVE system, because in that case we had met the soil cleanup goals. In the case of groundwater, it was a little more complicated than that. When I say declining performance, as you might expect, you run a system for years and years and years, and the system you wish would just continue to perform at the great rate that it always did, but nature has a way of things averaging out, and slowing down, and resisting. The contaminants in groundwater, in this case, can resist being lowered below certain numbers. There's a lot of chemistry going on, and it's actually pretty common for pump and treat systems to level off, and just not remove as much contamination as they did at the start of operations. Now, in this case, by 2004 though, we had -- we had removed more than 250 pounds of total VOCs by the system, 2,250 pounds by the soil vapor extraction system. So as it worked out, there was plenty to be recovered still in the soil. And you can bet that shortened the pump and treat time considerably. That contamination simply never made it to groundwater and was more efficiently removed by the soil vapor extraction. At this -- at that time in 2004, as the record of decision allowed, a technical maximization was approved by us and DHEC under which the PRPs and the contract -- their contractor proposed to us were going to finish off the groundwater contamination by doing something slightly different. This graph, by the way, shows you -- now, I have to admit, the -- I haven't got the numbers quite right, but the 2002 number and the '95 is correct. I realize here I never got to the middle two numbers, but that is in actuality what was happening. We were soon going to reach very little recovery per million gallons. That is what it's showing you. A million gallons of water to take out that much contamination.

It was getting very inefficient here in the late years. So anyway, as I mentioned, we're going to -- we approved a technical maximization measure. Sort of a quick study was done, what was proposed is called enhanced reductive dechlorination. Boy that is a complicated term, but it's -- it's really pretty -- it's really pretty simple. In all these years gone by since pump and treat, there have been some new methods that we've learned about that can actually clean up groundwater that has these particular contaminants VOCs in the water. And one of them is called enhanced reductive dechlorination. Essentially, there are bacteria down there in the ground, around the water and in it, and they are able, in -- in some conditions, if conditions are right to use what we consider a contaminant as their food source. They will actually consume it. And what the produce, fortunately, is a lot better for the environment, and is not toxic. And what has been found over the past 20 years is that if you make the conditions right in the subsurface, in the ground, the microbes, bugs in common terminology, will do the work for you; but you do have to make conditions right. You do have to distribute the solutions with the food in it, not just your contamination, but some additional food. You have to distribute that out into the aquifer, which can be difficult. It would be really great if it was all uniform, if it was like sand. You know, you drop some in, and it spreads out. That isn't how the geology is -- is here in this area. The -- the geology, in fact, doesn't tend to help you a lot get it out evenly. You really have to rely on the wells you have in the ground, and just putting a lot of it down, cover a lot of area, let the solution work its way through the aquifer, down slope usually like moving downhill on a -- on a sloping groundwater surface. So it -- it's -- it's difficult to explain, but I think here, the language here sort of gets across the -- the main points of it. To do this, you have to put down solutions of water that have a food source that the microbes want. You have to do that, and you have to do it in a lot of points. The -- the microbes respond by consuming that. They take your concentration of bad chemicals down. Your contaminants will be reduced. And the chemicals produced, which I haven't even mentioned here, are not a concern generally for -- for groundwater contamination, but they're not toxic. So this is what we have been doing now for some time. And -- and, in fact, longer than we intended, but like those doing the work, we kept thinking, this next injection may do it, realistically. It may bring us down so far that it will set the stage for change in the remedy, and having a lot of confidence in it. And that is, in fact, where we are tonight is changing the remedy, and having some confidence in this; but I'll demonstrate the choices here in a moment. It just took this long for that to be the case, 2004 to 2010. Six different treatments have been done, and we have seen significant reductions in the contaminant levels in groundwater across the side. There's more than -- oh, well, there's more than 45, I think, wells out there, and there's about 35 in the site monitoring program. So there are a lot of wells in which we can look and see what is happening. It's not perfect, the results aren't uniform, and there are some resistant areas that don't go down easily. And it's still being learned about why that is. But overall, we really have achieved -- I'm going to show you some evidence of that, some great results. The map that you see here on the screen represents what is left, and the colors are much better up here than on mine. We began in 1995 with roughly this, this entire area. I would hasten to add that the exact boundaries were always a little -- but this is approximately where the boundaries were as evidenced by wells -- the wells that we have onsite. What you see in dark blue is a good approximation of what is left in groundwater onsite. Now this just means that the groundwater underneath still has contamination in it that's above standards, above the cleanup phase. This dark hatched area is the three soil areas I mentioned earlier that were -- a lot of work was done at design, but the upshot of it is if we could just clean up the soil in these three areas, it would bring all of the soil to below a safe level. And the safe level in this case is where it would not impact groundwater. It was not really a people thing. You weren't going to be harmed. But that's where the mass was that was just going to go right down to in the groundwater if we didn't -- if we didn't deal with it with soil vapor extraction. Some of the progress you can see in the statistics. I don't generally like statistics, they're awful; but the hydrogeologists, in their wisdom, have come up with interesting ways to show reductions. And these box plots, as they're called, pretty much show what has happened just in the years since -- most of the years anyways, since we've been doing the technique of what I call the technical maximization business, which in documents is referred to as the supplemental remedy. And if you do read anything, at the Gaffney Library, where we have our documents, you're going to see it called a supplemental RA, or supplemental remedy. But what you see here is -- I -- I won't go into what these boxes represent. They do represent, roughly, a range of concentrations. But the -- the red diamonds and the blue ovals here, tell the story, a red diamond being the average, the average of what is inside wells. The blue -- I'm sorry, the blue oval is the average, right, Bill, and this is the mean, which is the median target is this one.

MR. O'STEEN: Yeah.

MR. HOWARD: Yeah. Yes, okay. Average, everybody knows what average is. Add them up, divide them by the number you have, average of the less. The mean is a little different. That's -- I'm sorry, the median is a little bit different. That number is a number, at which half the concentrations of the wells on site are above it, and half of them are below it. It kind of gives you a different look at the range of how much concentration are in the wells. That is a significant reduction. You see these numbers, by the way, are very small. Our cleanup goal is down from -- several of the contaminants is down around here, down around 005 or 007. However, if you consider that before -- back during pump and treat times, these would have looked like this. Now, this is just since 2004. So we've lowered the average, and we've lowered the median number. And, actually, we only have two wells, three now, I guess, that have more than this number in them. Only three out of the all the wells onsite. So we've seen all kind of reduction in the numbers in what is in the wells onsite; however, we are not at the cleanup level. That is really the ground level reason for changing the site remedy. We need to get to the cleanup goals. We need a different path to get there, even though what has been done to date has been successful. Going back to the original groundwater cleanup remedy will probably not work. The problems with it remain, and contamination would be likely to just level off again. We considered it in the study, actually. We didn't intend, finally, for the supplemental remedy to go this long. As I mentioned, Superfund requires that we get in front of the public, and get input, and -- about our decisions on how to clean up the site. We can't just change it because we feel like it. So this was always going to be brought back to the public to consider this, if we're -- if we're going to change what we told the public in 1991 that we were going to do. So in order to set a -- some groundwork for what to consider to move the site forward, we asked the potentially responsible parties to go ahead and prepare a focused feasibility study, focused only meaning that they don't have to start from the beginning of site cleanup the way you would if this was early in the project, remedial investigation stage. Then you would have to start with everything under the sun. Given where we are in cleanup, and what remains onsite, this -- the focused -- the -- the feasibility study could be focused. That is, go straight to the things you think are possible and evaluate them. Each of those possible ways to do it would be called an alternative. This was worked on during 2011, and it turned out to be a little more complicated than we -- than we thought. At the end of the year though, it was together and ready. I approved it at that time. And not long after that, I was -- before we knew it, me and Sherryl were issuing the proposed plan, which brings us to tonight's meeting. This -- this fact sheet right here is the proposed plan. And it's as short as I could make it. I'm sorry it's as long as it is, but I fought with them to make it this short. So, finally, we get back to where we -- to where we are, why we're here tonight. That document I mentioned, the focused FS, does what the regulations say we have to do. It judges and compares possible ways to clean up, which they call alternatives in the document. And we do it based on nine criteria. We just don't sort of choose. We go through these. Obviously, EPA would not pick one that is not going to achieve a minimum. It's -- it's got to work, and we've got to be satisfied that it will work, meaning that it will protect human health and the environment, and that it will actually meet whatever requirements are out there to do that action. As -- as you know, if you want to build a home or a building, or a school, or make -- build a bridge, there's going to be regulations and permits and requirements. We actually have requirements that are more environmental, or archeological, or historical. All those things have to be met. There are requirements under laws like the Clean Water Act, or the Clean Air Act, those things have to be met. So EPA would not really allow choosing an alternative that doesn't meet those two, we call them threshold criteria. Then there are five more that sort of balance out, and it's these five that you see listed here as balancing that really help us make the decision. Because some ways of cleaning up are going to be better. That's just -- it's going to happen that way. And they will be better when you look at these five different -- five different things. I won't go into a lot of detail on -- on -- on what these are. They -- they pretty much speak for themselves as you read them here. Cost is a consideration. I've had it asked, "How can cost be a consideration? You have to clean it up." Yes, you do have to clean it up; however, cost effectiveness is really what we mean here. Nobody wins if a lot of excess money is spent that didn't have to be spent. It should -- you should get bang for the buck if you're going to spend it, whether you're EPA or a private party. So there are five considerations there. I'll look at a moment -- a moment at how the five alternatives, and how they shook out. The two final ones can change the remedy that we're proposing if -- if the State really has a problem with it, obviously, we're talking with them. And if the community, if you all have an issue with this, that has to be taken into account. You know, our goal is to have a remedy that the community actually thinks will work. They agree with us, and they see why we're doing it. Those things do get considered, and I have seen them change the remedy completely. So we looked at five things. I didn't make a list, but the entire list is -- is in here, but I'll go through the five in fairly short order. The law requires -- the Superfund law, that we consider doing absolutely nothing. It's a baseline really is what is intended. What is the worst that could happen? And to do this, we don't actually spend any money. No money gets spent to actually control or deal with the groundwater; but we do some monitoring though to know what is going on. Here, what would simply ever happen is that the future risks would remain about this site. We do use funds though to monitor groundwater. Anytime you have contaminated groundwater on a site, and in many other conditions, EPA's got to do a five-year review. The purpose there is to force -- well, to have EPA look at a remedy, a cleanup plan. Maybe we chose this 15 years ago, and see if it's still working now. I didn't mention it, but we've done three of these already, the last one being 2009. So that kind of monitoring has to go on. I'm not wild about it. I'd just assume no action being really no action, but it's not reality. We -- we would make there -- we would cause there to be monitoring here, to see what is -- to see what is going on. Just because of the monitoring, there are some costs that you see, $32,000 a year. If -- if we place that over a 30-year timeframe, just for comparison sake, we come up with 450,000 something dollars, which is kind of goofy, isn't it, to say that's no action? But would you ever meet the cleanup goals? We -- we don't know. We don't know. As I'm going to mention in a moment, there are natural processes occurring in the groundwater, and they might take it down. They might gradually clean it up, but we don't know how long that would take; and we would not be monitoring for it, we would just be reporting the levels, that's it. Now, as opposed to that, you can do what is called monitored natural attenuation. As you see up here, this is what natural attenuation means. I kind of mentioned it earlier. Microbes, particularly bacteria, do the breakdown of the VOC, the contamination that is in the groundwater. Actually, that process is going on, whether any of us care for it to go on or not; it will happen, and it is happening. And there are some others, processes that is, that can reduce the contaminate levels. Taken together, we call it natural attenuation. However, in recent years, EPA has sort of developed, and a lot of private parties are working on this as well, and academia and so forth, sort of a methodology or protocol. And if you follow that protocol, you can actually document that the contamination is being taken down, and you can even project when it will finish out. You monitor it in a special way. You follow this protocol. And you're actually -- you're not causing it to happen faster than it would, but you're learning enough about it while you do it to project out when I'm going to get to my ground end point. When am I going to get there? So this does cost some money to execute that protocol. There's not really an upfront cost, a capital cost, but there is -- I didn't mention this, operations and maintenance, that's money you have to pay every year to do it. There is some of that, and that works out to more than 100,000 a year, so there is a big cost here. Big is a relative term, there are several big costs here in the other alternatives, but it's the biggest one so far 1.44 million, probably 30 years. It's fair to note here that these time estimates are problematic, it's very difficult. We're more interested in comparing them one to each other among the alternatives than we are any one timeframe number being correct. There's a lot of professional judgment in those timeframe estimations. There is a third way you can do it, and that is to go back to pumping and treating again. This has been done onsite, and we would simply resume it. We would actually retrofit the system, bring it back up to speed. It would require some upgrades here and there, because the years have gone by; but you could do it, and you could start it back up. There's -- there's really -- it's hard to make a case for doing this. It -- it is expensive, and the problems that caused us to bring it to a close last time could well reoccur. And you can expect them to, because you have actual experience on this site that it didn't happen. You wouldn't be saying maybe, you'd be saying this happened last time. It was considered and looked at here. As you see, it is expensive, more than 300,000 a year, 3.5 million over the total life of the project, which would probably be 20 years. And you would have to have some construction timeframe in there. That's not terribly important other than it would be -- you'd lose that time before you started it up. Another way to do this would be to just continue doing what we are doing now, which is enhanced reductive dechlorination. We talked about this a little bit earlier, but here's kind of a walk-through, I'll let you read that about what actually happens to do the ERD treatment. And that's an important note here about the breakdown activity, it's -- it's the same. But you are placing more food, if you will, for the microbes that are doing the work than is there by nature alone. So you're enhancing processes that do occur, and would occur, but you're enhancing them. As I mentioned, it has a rest period, groundwater flow spreads everything out. Then you sample to see how far the extent goes, and how much reduction. What's the sheer drop that I get when I do that? There was a fifth way, whoops, there's my cost, I didn't mention the cost. You see that this is still a, you know, substantial cost. The capital cost here will actually

-- would actually include some improvements to the injection system infrastructure, which is wells -- mainly wells. Five years of this would be done. It would be -- it would be five treatments, and then we'd have five years of groundwater monitoring that we would expect to do; giving you an estimated time of ten years to get to this. And you see now, there are some differences in years to get to among these choices. Six months at most, really, that's conservative, but it -- it might be less to get things built for. Then there's a final way that we considered, and that was another in situ chemical treatment, but this one is different than what I just described for the enhanced reductive dechlorination. With this one, called in situ chemical oxidation, you do inject treatment solutions like you do with ERD, but it's a completely chemically different kind of solution. And it has a totally different effect on the water in the aquifer. It's difficult to describe this in detail, but essentially you change the chemistry of the groundwater completely, and you chemically remove them, no microbes needed. You just chemically -- you can think of this as what you might get if you experiment in a beaker. I mean when you get enough of the stuff dropped in there, the color changes, the stuff precipitates out, bam, just -- that's it, bam, it's changed. Now, to do that, however, there's a lot that would have to be done under this alternative to make that possible. Mainly, you'd have to do this big pilot study mentioned here. You'd have to do a pilot study to figure out how far the wells apart will have to be, to reach that stuff into the ground and have the effect I want. And then I've got to run pipes and lines out to those wells so that I can put them down or set up a system to carry my delivery system around. That's more like what's being done now. They -- they go on a well-by-well basis. They operate out of a trailer. You might could do that here, you might could. But you would have to do the study -- the pilot study to determine how best to get that stuff down and injected. So an estimate would be three years' annual injections for those three years, which means three treatments. And then you'd have about seven years of monitoring the groundwater. There are substantial costs here too. You'd have to do the pilot study, and do some other setup for this money you see here, 375. $400,000 a year to do it. 1.97 million gives you a pretty high cost. Six months probably if done right, and a successful pilot study was done about ten years. About ten years to get it -- to get it done. So it might not be a surprise, but when all the pros and cons were worked out, strengths and weaknesses of the different alternatives, it does seem that the best alternative -- our preferred alternative is to continue with enhanced reductive dechlorination. It's -- it's a fairly straightforward case to make. It does meet our threshold criteria for choosing it. It will be effective in the long-term and permanent. When you -- when you take the contaminants out by the microbial action that they do, you are reducing the toxicity, and you're taking that water out from what's counted as contaminated, so you're taking the volume out. It achieves those effects differently than do some of the other ones' choices here. Mainly, you'll get less time to do it than either pump and treat, which is called recovery treatment here, that's called alternative three; or Monitored Natural Attenuation, MNA, starting right now, because, again, it's an active treatment that you do with ERD. Less time to reach the cleanup goals. Now, compared to the -- to pump and treat, alternative three, and compared to ISCO, which I described a moment ago, it's easier to do it. You don't have to do the big pilot study. You can leave the groundwater chemistry as it is right now. I didn't mention this really, but the groundwater chemistry right now is favorable. The injections have been going on for a period of time to where they're conducive, they're suitable for continuing to reduce the contamination away, just by what's in the ground now. That affect on the groundwater has been achieved, just because of the repetition of these treatments. So it -- it's more easily implemented for sure. It is more cost effective, obviously. You heard me mention a couple of large costs for alternative three, which is to recover and treat, pump and treat; and alternative five, which is to do the in situ oxidation. Those are most of our reasons, but this site also has a case to be made for a contingency remedy. What is a contingency remedy? It's a backup more or less. It sets up a remedy that EPA would choose or -- or invoke in the event of certain things happening. You've heard me mention that the groundwater is in a chemical situation where the contamination is -- is going away. Now, we can speed that up by doing our treatments, and that's what we're doing. But if there comes a point where it is demonstrated that -- that this choice, ERD, the preferred alternative, can't meet the cleanup goals sooner than you will meet them with monitored natural attenuation anyway, then, at that time, a case can be made for natural attenuation. At that point, EPA would -- the -- the private parties would, their contractor would propose to EPA and DHEC we think the time is now. Special kind of monitoring begins. We look at the data from that monitoring. We make sure it really is happening. And we also make sure, and this is important, that the timeframe for it happening is acceptable to us. We -- we won't go with something that's going to take forever to get there. So in some ways it's a difficult showing to make. But in the event that can be shown, then -- then we would agree, at that point, that we should invoke this contingency remedy or backup remedy, and move into Monitored Natural Attenuation. Now, we would not do that without coming back to the public again. And we have this thing called an explanation of significant differences. It's a change to the cleanup plan that's less serious, than what we're proposing here tonight. But it's still a change, and it still deserves to be weighed in on by the public. At this point, if we were going to invoke the contingency remedy and go to MNA, it would be fairly obvious and straightforward. It would be, the case would be made, the guidance that EPA has would be met, and we would be coming and explaining that to the public why, why are we going to that? So let's see, I'm trying to think, there must be -- there has to be something not clear here on any long technical presentation. So I would love to hear any questions, because y'all have been very patient with us. Does this make sense mostly, I hope?

MR. MATHIS: Yeah, you -- did a good job.

MR. HOWARD: Thank you.

MR. MATHIS: In the presentation.

MR. HOWARD: I hope so. I hope so.

MS. SARRATT: Well, I'm the only one, other than Charles that's not government.

MR. HOWARD: And I am so sorry that that's the case. I'd much prefer to take this as a successful thing.

MS. SARRATT: Well, I feel like you -- all these folks -- except Charles, maybe already knew everything.

MR. HOWARD: Right.

MS. SARRATT: So you were talking to me.

MR. HOWARD: And I'd rather be speaking to a larger group, I'm just being honest, you know.

MS. SARRATT: I even went to neighbors and told them about this.

MR. HOWARD: Thank you.

MS. SARRATT: And you see how many of my neighbors came.

MR. HOWARD: Thank you. They're -- they're awful for not being here. Where are they?

MR. HOWARD: In my imagination, there were people in all these chairs.

MS. SARRATT: Pardon?

MR. HOWARD: In my imagination,

there were people in all these chairs.

MS. SARRATT: Well --

MR. HOWARD: That's the only --

MS. SARRATT: Well, good. I am the third house away south on Burnt Gin.

MR. HOWARD: South, okay, on Burnt Gin?

MS. SARRATT: Yeah, 1033.

MR. HOWARD: So you're the same side as --

MS. SARRATT: I'm the -- I'm the yellow framed house with the horses.

MR. HOWARD: I know where that is, okay.

MS. SARRATT: Yeah.

MR. HOWARD: And you're on the Medley side --

MS. SARRATT: Yeah.

MR. HOWARD: -- from what I remember, right?

MS. SARRATT: Yeah.

MR. HOWARD: Okay.

MS. SARRATT: That's me. And I've never got anything in the mail.

MR. HOWARD: Really?

MS. SARRATT: Really.

MR. HOWARD: I'm so sorry, and -- and -- and Sherryl over there is even sorrier.

MS. SARRATT: So she said -- she said, "Do you want one of these?" And I said, "Huh." And she said, "You got one in the mail." And I said, "I don't think so."

MR. HOWARD: Oh. I can't explain that because we actually -- Sherryl drove around with one of -- one of your -- the newer people in community involvement, and they gathered up addresses literally out here by riding; so I can't explain how that didn't -- how that missed you.

MS. SARRATT: I'm going back over there, and I think I'm going to say any prior mailings that I've missed, I think I want to do that.

MR. HOWARD: Did you -- did you see the newspaper ad then?

MS. SARRATT: That's the only reason I --

MR. HOWARD: That's the only reason you came, oh. I -- I really apologize. And it confirms what Sherryl has already said, which is, sometimes it is -- it is very hard to get these things delivered even though we think they are.

MS. SARRATT: Yeah, I saw the week -- I saw it in the Weekly Ledger.

MR. HOWARD: Okay.

MS. SARRATT: 'Cause I don't subscribe to the others.

MR. HOWARD: Uh-huh.

MS. SARRATT: I just pick them up whenever I'm around, 'cause I'm --

MR. HOWARD: That's the little --

MS. SARRATT: I'm gone a lot.

MR. HOWARD: Right.

MS. SARRATT: So I don't want them sitting in my mailbox, or sitting --

MR. HOWARD: Is that the weekly free paper?

MS. SARRATT: Yeah, that little free one. That's --

MR. HOWARD: That paper, okay.

MS. SARRATT: That's where I saw it.

MR. HOWARD: Well, I'm glad you had that, so -- and I apologize for us not -- we would like to have you added to the mailing list, if we don't have --

MS. SARRATT: I think -- and, please.

MR. HOWARD: Wonderful.

MS. SARRATT: So along with that please, if there's other things that I have missed over the -- I would love to see. My interest goes -- I -- I've been in the house since '72.

MR. HOWARD: Wow.

MS. SARRATT: And you -- that smell was awful.

MR. HOWARD: During that time that it was being used as a dump?

MS. SARRATT: And I didn't have air conditioning back then. And in the summertime, you know how it gets.

MR. HOWARD: Right.

MS. SARRATT: It's oppressive and it goes like this.

MR. HOWARD: Right.

MS. SARRATT: And you want to shut the window to keep the smell out, but you die otherwise because you need air.

MR. HOWARD: Uh-huh.

MS. SARRATT: It was awful. And between '72 and six I was married, and then we split. And I -- I used to -- I taught, so I was home in the summers, and I could just watch the panel trucks go by, full of barrels. And, oh, yeah, and my ex and I tried to get it told and stopped back then, and nobody would listen.

MR. HOWARD: I'm sure that's true, although it -- it must have gotten to the State, at some point -- my understanding is, there were a couple of different ways the site was found out. But -- but one of them was a report to DHEC, wasn't it, Greg? From someone who -- there was a report to EPA by a company.

MR. CASSIDY: Yeah, I think it was, yeah.

MR. HOWARD: That went a different

path at EPA. They eventually figured out where that was. But then separate from us was, I thought, a citizen's report to DHEC.

MS. SARRATT: But, you know, I don't --

MR. CASSIDY: And that was all pre-CERCLA too.

MR. HOWARD: And it was all -- it was, wasn't it? It was pre-1980 even.

MS. SARRATT: But I know he was probably the one that was more active in -- in --

MR. HOWARD: Right.

MS. SARRATT: 'Cause, you know, he had more time than I did, --

MR. HOWARD: Right.

MS. SARRATT: -- At the time, to -- to be -- during business hours, and what have you.

MR. HOWARD: Right.

MS. SARRATT: And, you know, 'cause I know he'd come back in, and say, "Nobody's listening." I know he was frustrated.

MR. HOWARD: There's quite a story

back there, with the history of the site that led to it.

MS. SARRATT: But I could just see the panel trucks come by. It just -- almost every day.

MR. HOWARD: Uh-huh.

MS. SARRATT: You know, it -- and it was -- but the smell, I mean there's no describing that smell.

MR. HOWARD: I'm pretty sure there were odor complaints.

MS. SARRATT: Oh, yeah.

MR. HOWARD: I think, honestly, there probably is a story back there about why it took that long to -- to get to the level where the State guys were out there. And they may have been out there earlier, and not seen very much; or by comparison to other sites, not seen very much. But, eventually, by 1982, 1983 the state --

MS. SARRATT: Well, I was very happy when --

MR. HOWARD: Saw, you know, and we were out there in fairly short order, and this --

MS. SARRATT: I felt sorry for the guys in those zoot suits, 'cause it was really hot that summer.

MR. HOWARD: Uh-huh.

MS. SARRATT: I felt sorry for them really, but I was so happy that something was getting done.

MR. HOWARD: Uh-huh.

MS. SARRATT: I'm curious about this fault.

MR. HOWARD: Right.

MS. SARRATT: Because I was on a well up until, I think, probably the late '80s, early '90s.

MR. HOWARD: Uh-huh.

MS. SARRATT: And I had -- mine was a four-foot square hand dug, and I had nine-foot of water in mine, when it was -- it was 69-foot hand dug, and I pretty much kept nine-foot of water in there. I'm curious how --

MR. HOWARD: So you were using the well then?

MS. SARRATT: And, oh, yeah, that was my water. And I went on to city after the upper part collapsed, and the city had gone by maybe a year before it collapsed. So I was on that a long time. So I guess one of my questions is was any of that ever down that way. And I remember geologists, they did this -- the water samples.

MR. HOWARD: Uh-huh.

MS. SARRATT: And they came back at the time and said it was okay, at the time.

MR. HOWARD: That's -- that --

MS. SARRATT: But the question is --

MR. HOWARD: Right.

MS. SARRATT: Was it really, and was it after the fact for the years after that, that I might have been on it? But I'm curious on that fault again. And -- and is that an earthquake fault? My friend says we get earthquakes, so I'm sitting on one.

MR. HOWARD: I haven't read the geology enough to know if that's fault that moved in historic time. I don't think so. What I know of the geology would say --

would say that fault's been there a long time, many years, and has not moved. But depending on when you were no longer using that well for water, when you moved to about 1982, well, '83, '84, '85, the site was being visited on a somewhat regular basis by people from DHEC and people from EPA. And DHEC actually installed -- I think it was either four or five wells out there that were being at wells at Medley, remember? And so the site was being monitored, I think you could -- could fairly say; even if they didn't know how big the problem was. And then once that remedial investigation got going in 1988, wells began to go in all over the site. The thing that makes me say that you were probably not at risk is that the initial sampling where they sampled yours, they were looking at all the wells around.

MS. SARRATT: Yeah, everybody's well.

MR. HOWARD: In all directions, without regard for where the flow was.

MR. CASSIDY: I think there's a survey.

MR. HOWARD: Right.

MR. CASSIDY: That was around a mile.

MR. HOWARD: It was more or less a circular -- what is called a well survey. And we know now that you're not in the direction that the groundwater moves towards.

MS. SARRATT: Yeah.

MR. HOWARD: Now we know that. The great thing about groundwater flow directions is they tend to persist over years or decades when you're talking big distances, they tend to persist. It's not going to be -- it's not going to be dramatically different than it was.

MS. SARRATT: So just because of the way the fault was, I was --

MR. HOWARD: Right.

MS. SARRATT: It wouldn't have got caught. I forget which way was what.

MR. HOWARD: No.

MS. SARRATT: It wouldn't have got caught in there, and gone down in there either then. 'Cause I remember the person, at the time --

MR. HOWARD: Where -- where you're located, actually, yeah, the fault -- yeah, I mean you don't need to think of the fault as like a super highway with water in it. You -- you -- you don't. And where exactly it traces out to, it hasn't really been -- been determined, it probably continues on. But it may not have that difference that I was describing. It may -- it may not have that. It doesn't have that kind of height in the ground everywhere.

MR. CASSIDY: And the movement on these things is very slow.

MR. HOWARD: Right the movement is very slow.

MR. CASSIDY: It’s not miles.

MR. HOWARD: Yeah.

MR. CASSIDY: It's like feet.

MR. HOWARD: Yeah. Well, not only that, but the topography of the ground can be so different that over where you are, it's just like this. And even on the diagram I show, it's as little as 20 feet in some places, and 50 in others.

MS. SARRATT: Yeah.

MR. HOWARD: So it's probably not a -- a factor where -- where you -- you were. Especially given when you say you were off of that -- off of that well water.

MS. SARRATT: And -- and --

MR. HOWARD: It's not been the kind of site where it's been a big threat to migrate offsite either.

MS. SARRATT: Yeah, so then --

MR. HOWARD: So --

MS. SARRATT: I'm pretty much --

MR. HOWARD: Yeah, you -- honestly --

MS. SARRATT: It's not going to be something that's going to come back and haunt me?

MR. HOWARD: It's not going to come back and haunt you.

MS. SARRATT: And I will throw this out, for the record.

MR. HOWARD: Uh-huh.

MS. SARRATT: When -- when -- at

the point, when you started the clean up.

MR. HOWARD: Uh-huh.

MS. SARRATT: And the investigating, and all that --

MR. HOWARD: Right.

MS. SARRATT: Both Mr. and Mrs. Medley were still alive, and she had cancer, by the way.

MR. HOWARD: Yes.

MS. SARRATT: And -- but her -- across the road, my -- my elderly neighbor, they were good friends, and at the time you were starting this cleanup, Ms. Allison came, and she says, "I don't understand what the big deal is." She says, "That's where we pick our blackberries."

MR. HOWARD: I think maybe that got recorded. I was probably at that meeting. That was nine -- that was a school.

Wasn't there once a school farther up South Carolina 18?

MS. SARRATT: It was --

MR. HOWARD: Going into -- let's see, going into Gaffney.

MS. SARRATT: There's --

MR. HOWARD: There was a school on the right, I think.

MS. SARRATT: No, there's --

MR. HOWARD: No.

MR. MATHIS: An old high school.

MR. HOWARD: That's the one.

MS. SARRATT: Yeah, in town, the old high school in town?

MR. HOWARD: Well, I guess so, but kind of at the south end?

MR. SARRATT: Yeah.

MR. HOWARD: Yeah.

MS. SARRATT: Yeah, that's the old high school, it's a middle school now.

MR. HOWARD: That's where the meeting was.

MS. SARRATT: I didn't make it to that meeting.

MR. HOWARD: And I was at that meeting.

MS. SARRATT: I may have been out of town.

MR. HOWARD: I could almost swear I

remember it.

MS. SARRATT: But I -- I -- when she told me that, I just went, oh, my God, I can't believe you just said that.

MR. HOWARD: Uh-huh. It was a concern. People were coming onto the property, according to the Medleys, who were not supposed to be.

MS. SARRATT: Oh, yeah. But they were picking blackberries and -- I mean they were just good friends, and they just did it, and --

MR. HOWARD: Uh-huh.

MS. SARRATT: But see, in -- in their minds, that there wasn't anything wrong with it.

MR. HOWARD: Right, right. Which gets to something important, which is, people expect to be able to use the land; and they expect the resources to be there and not be contaminated.

MS. SARRATT: That just shows how much we've come in environmental issues and concerns in 30 years.

MR. HOWARD: Uh-huh. It is. A lot's been learned on all sides.

MS. SARRATT: But I'm glad that you're doing what you're doing, and I'm glad that I finally can understand what's been going on.

MR. HOWARD: I'm glad for that. That was my whole --

MS. SARRATT: 'Cause, you know, I know you -- I knew you had the 15 mile an hour signs, and I knew there was stuff. And, in fact, I rode my horse back there on the roads the other day.

MR. HOWARD: Right.

MS. SARRATT: Since he's got it cleaned out. Since Mr. Goode's got it cleaned out.

MR. HOWARD: Uh-huh.

MS. SARRATT: He lets me ride on his stuff, and it's the first time I've been meaning to do it. I was like, I'm going to go back there and see. So I finally have seen what you mean by the wells, and I understand what's going on.

MR. HOWARD: Uh-huh. Excellent. So horseback riding you say?

MS. SARRATT: Yeah.

MR. HOWARD: Excellent.

MS. SARRATT: I road my horse back there, and across the road, back down in there too. Mr. Good and a couple of the others.

MR. HOWARD: He tells us he intends to plant that site with --

MS. SARRATT: He already has put some trees in.

MR. HOWARD: -- with trees.

MS. SARRATT: He already has. I've seen some.

MR. HOWARD: We have --

MR. MATHIS: We've had -- that property changed hands not long ago, didn't it?

MS. SARRATT: Yeah.

MR. HOWARD: It did.

MS. SARRATT: He -- yeah.

MR. HOWARD: He's now the legal owner, and --

MS. SARRATT: He got it maybe in the last year.

MR. HOWARD: He bought it from Sam.

MS. SARRATT: Yeah.

MR. HOWARD: And I know it took some time to get it -- to get it settled. The sale was a bit unusual. I'll let John Good explain that. But he is the legal owner, and he is very clear about tending to plant --

MS. SARRATT: Put trees on it.

MR. HOWARD: -- And restore the trees.

MS. SARRATT: Yeah, well, I -- I've seen -- he's -- he's got some --

MR. HOWARD: He wants to put a natural forest back there.

MS. SARRATT: He's got some. They're about this high.

MR. HOWARD: Right.

MS. SARRATT: And they're back in there.

MR. HOWARD: And he has gone in there and planted them. And tells us that he is going to continue to plant, and that he's finished with the roads that he's pushed in there.

MS. SARRATT: Yeah.

MR. HOWARD: We were kind of glad to hear he's finished with his roads.

MS. SARRATT: But, you know, he -- he owns across the road too.

MR. HOWARD: Right.

MS. SARRATT: And he's --

MR. HOWARD: Right.

MS. SARRATT: He's very good with what he does, and how he does it.

MR. HOWARD: Uh-huh.

MS. SARRATT: He's very good at it. But I just -- he lets me ride on some of the established roads that he's got back in there.

MR. HOWARD: Very good. Thank you for letting me know that. You sort of filled out some things that I didn't know.

MS. SARRATT: Yeah. Yeah, they're about -- it's -- it's not all over yet, but, you know.

MR. HOWARD: Yeah, he's very clear about what kinds of trees. He wants an actual forest to be restored is what he's saying.

MS. SARRATT: Which he has done across the way. It's -- I think he's put some pines in across the way that he'll cut and do too, so --

MR. HOWARD: Right.

MS. SARRATT: So he might do something similar.

MR. HOWARD: It's a large piece of property, I think, that he owns across the street.

MS. SARRATT: Yes, and he'll probably do a little of both. But he didn't clear cut it all the way. I mean there's still trees in certain areas that he didn't cut.

MR. HOWARD: He has a forestry background, and he's very clear about what are good trees, and what are not good trees.

MS. SARRATT: Yeah.

MR. HOWARD: So if he follows

through with that, he -- he will, in fact, restore the forest that was there at one time.

MS. SARRATT: And he's --

MR. HOWARD: It seems to be his driving passion with the use of the land. Now, our concern is that he not mess up with the cleanup, you know. We've got wells out there. There are pieces of equipment that remain out there. There's, you know, a couple sheds.

There are areas that we don't want him to do certain things. But in other parts of the property, he -- he really is going at it.

MS. SARRATT: I'm sure he'll -- I'm sure he's of the type mindset that he would --

MR. HOWARD: Right.

MS. SARRATT: Honor what you're trying to do, 'cause it'll --

MR. HOWARD: He seems to -- he seems to be very willing to work around --

MS. SARRATT: I'm surprised he's not

here, actually.

MR. HOWARD: He explained to me that he wouldn't be here.

MS. SARRATT: Oh.

MR. HOWARD: He had something involving his son this evening that he had to go to, so --

MS. SARRATT: Well, you guys are in close contact, but --

MR. HOWARD: He talks to us regularly.

MS. SARRATT: Yeah, but --

MR. HOWARD: Mr. Mathis, any questions that you might have?

MR. MATHIS: No, sir.

MR. HOWARD: Okay, great.

MS. SARRATT: But, yeah, do what you need to do. Get it cleaned up.

MR. HOWARD: Thank you. And that's a good set of words on which to end the meeting. Thank you. Thanks for coming.

MR. MATHIS: Yes, sir.

MR. HOWARD: We'll call it a night. It's late. Thanks so much.

MR. MATHIS: Thank you.

(Whereupon, the Meeting was concluded.)

CERTIFICATE OF REPORTER

I, Cathy L. Young, CVR, a Notary Public for the State of South Carolina, do hereby certify that I reported the foregoing proceedings at the time and place herein designated and that the foregoing pages, are a true, accurate, and correct transcript of the aforesaid proceedings.

I further certify that I am not a relative, employee, attorney or counsel of any of the parties, nor relative or employee of such attorney or counsel, nor in anyway interested in the event of said cause.

In witness my hand and official seal this the 3rd day of April, 2012, Greenville, South Carolina, State of South Carolina.

Cathy L. Young

Cathy L. Young, CVR